Marketing Hardwood

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HIGH GRADE

VENEER GRADE

LOW GRADE

MEDIUM GRADE

FOREST SERVICE, U.S.D.A.

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MARKETING NORTH MISSISSIPPI HARDWOOD:
PRIME QUALITY AND SPECIALTY TYPES

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Preface

The Bureau of Business Research of the School of Commerce and Business Administration is privileged to publish this study of North Mississippi hardwoods. The purpose of the report is to provide market information to hardwood owners in the North Mississippi Forest Survey Region which, it is hoped, will be of some assistance to them in marketing hardwood on a more profitable basis. This study emphasizes the marketing of prime quality and special type hardwoods.

It is believed that information on the characteristics of hardwood supply, price and cost estimates, and practices and specifications of hardwood log buyers will enable timber owners in the Region to market their timber products more systematically and with greater financial return.

This research effort has largely been the work of the author of this publication, and it is to his personal credit that he has elicited cooperation and support from the Southern Forest Experiment Station, Forest Service, United States Department of Agriculture; the University Committee on Faculty Research; the Department of Economics and Business Administration; and the Bureau of Business Research. Mr. Ernest N. Waller, Research Associate in the Bureau of Business Research, deserves a commendation for the excellent editorial and professional services rendered in the publishing of this monograph. The author accepts the customary responsibility for the materials presented and the views expressed.

Edward H. Hobbs
Director
Bureau of Business Research

Acknowledgments

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CHAPTER I

INTRODUCTION

The North Mississippi Survey Region includes twenty-six counties in an area extending southward from the Tennessee line about one-fourth the length of the State and westward from the Alabama border to the Bluff-Hills on the eastern edge of the Mississippi Delta. The harvesting and marketing of hardwood produced in the Region differs from that in surrounding areas in several respects. First, the hardwood timber stands are scattered and are not very uniform because the commercial timber land in the area is a mixture of hill land and river-bottom lowlands. Harvesting problems are related to these and other characteristics of the hardwood stand.

In addition, market outlets for hardwood forest products within the Region are limited. Most of the output is marketed outside of the area. Because of the peripheral location of the area in relation to the hardwood-consuming markets in central Mississippi, western Alabama, and central and west Tennessee, owners of hardwood experience certain problems in marketing output successfully. Greatest difficulty is encountered in marketing prime logs for commercial veneer and high-valued species of hardwood for specialty products.

Although there are many firms drawing pulpwood and other primary hardwood products from the Region, the proximity of the Memphis market makes it an attractive outlet for high-grade and specialty-type hardwood.

Purpose of Study

The purposes of this study are (1) to create among prospective buyers an awareness of the nature of hardwood supply in the Region and (2) to determine the most desirable approaches to available hardwood markets for producers to follow in marketing their products. Primary emphasis is upon identifying both supply of and markets for the most valuable hardwood products. It is hoped that information contained herein will improve the marketing of high-grade logs and special species of hardwoods of high value.

Method Employed

In order to appraise and locate the supply of hardwood timber in the Region, a description of timber stands is presented in Chapter II. This description focuses attention on characteristics of hardwood supply affecting economies of selecting, buying, and logging hardwood timber.

Economic aspects of production are presented in Chapter III. The connecting link between the primary producer and the consumer is the subject of that chapter. The scope of production includes harvesting and marketing processes which create various types of utility in primary hardwood products.

Chapter IV is a description of the Memphis hardwood market from the standpoint of production organization, competition, and procurement practices. It is intended as a guide to prospective sellers in that market to assist them in recognizing opportunities and economic limitations in marketing hardwood logs.

The method employed in making this study may be divided into two parts. First, the data used in the study of hardwood supply were obtained from secondary sources, primarily the 1957 Mississippi Forest Survey and other publications of the Forest Service of the United States Department of Agriculture. Second, data used in the study of production and marketing costs and prices of logs and other hardwood products were obtained through interviews with lumber manufacturers, sawmill operators, and timber owners. Published prices of hardwood lumber at the wholesale level were obtained from the Hardwood Market Report. Also, some questionnaires and letters by direct mail were used. The interviews proved to be very fruitful in obtaining general information on manufacturing operations and wood requirements and very poor as sources of information on manufacturing costs and log purchase prices. As a general rule, buyers were extremely reluctant to quote prices on logs, while sellers were more favorably disposed to do so. Therefore, the limited scope of log price quotations reduces their reliability for specific decisions. However, they do appear to be adequate for the conclusions in this study.

CHAPTER II

SUPPLY AND LOCATION OF HARDWOOD STANDS

A description of the supply of primary products of the hardwood forests in the North Mississippi Forest Survey Region is presented in this chapter. Special attention is devoted to the location of sawtimber volume by county, species, and annual cut. Also, some emphasis is placed on concentrations of hardwood sawtimber by species, stand size, class of timber, and other characteristics likely to be useful in identifying high grade and marketable timber. It is hoped that such detailed information will be useful to prospective buyers, not only in identifying the existence of the timber, but also in locating the particular kind desired in their operations and in estimating costs of purchasing, harvesting, and transporting. The over-all purpose of the chapter is to stimulate interest in a valuable resource which may bring prospective buyers and sellers together on an informed basis.

A very general characteristic of the Region, of which the total land area is 8,199.7 thousand acres, is indicated by information in Table I which shows the distribution of land by use in 1957 to include about 51 per cent commercial forest land. Of the State's total land area, about 57 per cent is classified as commercial forest land, with 64 per cent of the Central Region so classified, 63 per cent of the Southwest, 72 per cent of the South, and 35 per cent of the Delta. The equal allocation of land in the Northern Region to commercial forest and nonforest uses suggests that farming activity is quite extensive in the area. Also, hardwood stands probably are either widely scattered in woodlots on individual farms or concentrated in a limited number of river bottoms and other lowlands suitable for growing hardwood trees.

The distribution of hardwood forest land by stand size and forest type is indicated in Table II. Over one-half of the commercial forest land is classified as hardwood commercial forest land. A substantial portion of the hardwood land is in the oak-hickory forest type. About 16 per cent of the hardwood land is stocked with sawtimber and about one-half with pole timber. While the oak-hickory type produces most of the sawtimber in this area, there are significant acreages of oak-gum-cypress sawtimber.

Table I

FOREST AND NONFOREST LAND IN
NORTH MISSISSIPPI SURVEY REGION, 1957

Land Use	Thousand Acres
Forest:	
Commercial	4,204.0
Noncommercial:	
Productive-	
Reserved	12.4
Total forest	4,216.4
Nonforest	3,983.3
All land	8,199.7

Source: Mississippi Forests, Forest Survey Release 81 (New Orleans: Southern Forest Experiment Station, 1958), Table 6, p. 20.

Table II

HARDWOOD FOREST LAND BY STAND-SIZE AND
FOREST TYPE IN NORTH MISSISSIPPI SURVEY REGION, 1957

Hardwood Types	Amount (thousand acres)					
	All Stand Sizes	Large Saw-timber	Small Saw-timber	Pole Timber	Seedling and Sapling	No Stock and Other Areas
Oak-hickory	1,750.9	76.4	150.3	838.7	628.5	57.0
Elm-ash-cottonwood	105.4	17.6	11.1	58.3	16.0	2.4
Oak-gum-cypress	563.6	39.4	99.7	251.5	156.6	16.4
Total	2,419.9	133.4	261.1	1,148.5	801.1	75.8

Source: (See Source, Table I), Table 9, p. 22.

1. VOLUME OF HARDWOOD SAWTIMBER

Total volume of hardwood sawtimber in the Region is of general interest to the prospective buyer seeking to locate timber supply. For estimating costs of harvesting, processing, and transporting logs and lumber, more detailed information is desired. Such factors as average volume per acre; volume by log class, stand quality, species, tree diameter, and stand size; and geographical location by volume and species are emphasized in this section.

Total Volume by Class and Species

The distribution of hardwood volume by class of timber and species is shown in Table III. The most common species are oaks and gums. Red oaks and white oaks make up the greatest supply of hardwood sawlog timber in the area. There is a building-up of volume in white oaks in the pole timber class. Sweetgum is important in both sawlog volume and pole timber.

Table III

TOTAL VOLUME OF HARDWOOD BY CLASS OF
TIMBER AND SPECIES IN THE NORTH MISSISSIPPI SURVEY REGION, 1957

(Million Cubic Feet)

Species	All Timber	Growing Stock				Hardwood Limbs	Cull Trees
		Total Growing Stock	Sawtimber Trees		Pole Timber Trees		
			Sawlog Portion	Upper Stems			
Red oaks	416.3	239.5	102.8	37.3	99.4	39.1	137.7
White oaks	376.6	229.2	86.9	33.5	108.8	30.3	117.1
Hickory	174.7	103.5	40.8	15.5	47.2	13.0	58.2
Sweetgum	262.0	189.9	72.2	24.7	93.0	6.9	65.2
Black and tupelo gums	93.1	61.9	27.5	7.8	26.6	2.8	28.4
Other hardwoods	394.0	193.4	79.7	25.2	88.5	24.1	176.5
Total	1,716.7	1,017.4	409.9	144.0	463.5	116.2	583.1

Source: (See Source, Table I), Table 14, p. 28.

The general quality of hardwood in this Region is indicated by the high portion of volume in trees classified as "culls." Actually, about 44 per cent of total volume was so classified in 1957. On the basis of ratio of sawlog portion of growing stock to cull trees, the sweetgum seems to be of the best general quality in the area.

This combination of general characteristics of volume of growing stock in the area seems to suggest that buyers desiring oaks and gums, particularly red oaks and sweetgums, may find this Region to be a worthwhile source of supply. On the other hand, such buyers should be prepared to be selective in procurement because of the high percentage of volume in cull trees.

Average Volume per Acre

The cost of logging a tract of timber is affected by the yield per acre. There is a minimum amount of equipment which the logger must use in removing logs from stumps to truck roads. He must also devote a minimum amount of time and labor to moving equipment from one tract to another, all of which requires a minimum amount of cost which is fixed in character. High-yield operations tend to reduce this cost per unit of output and low-yield work increases this cost. For this reason, the average sawtimber volume per acre in the Region is shown in Table IV. This is not the same as yield per acre and is shown as an approximation only.

Table IV

AVERAGE HARDWOOD SAWTIMBER VOLUME
PER ACRE IN THE REGION, BY FOREST TYPE, 1957

Hardwood Type	Board Feet
Oak-hickory	748
Elm-ash-cottonwood	1,412
Oak-gum-cypress	1,462
Average for Region	943
State average	1,353

Source: (See Source, Table I), Table 25, p. 42.

Table IV shows that the highest average volume per acre is of the oak-gum-cypress hardwood type. This situation is in line with other facts showing oak and gum species to be the most predominant hardwoods in the area from an over-all point of view. However, the very high volume per acre of elm-ash-cottonwood is new information not shown in previous tables. Total acreage in the Region on which this forest type is grown is limited to 28.7 thousand acres, yet average volume is high. This situation suggests that this forest type is in good supply in the area and that the volume is concentrated in relatively small areas suitable for logging at comparatively low cost per unit of output.

Table V

HARDWOOD SAWTIMBER VOLUME IN THE
REGION BY LOG CLASS AND STAND QUALITY, 1957

Class	Million Board Feet
All classes	2,528.9
Standard Lumber Logs:	
Grade 1	81.5
Grade 2	377.6
Grade 3:	
Total	1,411.1
In Fair and Better Stands	405.1
In Poor Stands	1,006.0
Tie and Timber Logs:	
Total	658.7
In Fair and Better Stands	130.0
In Poor Stands	528.7

Source: (See Source, Table I), Table 28, p. 43.

Volume by Log Class and Stand Quality

Another way of appraising the timber of the Region as raw material for the hardwood industry is provided by estimates of sawtimber volume in different grades of logs. These estimates are shown in Table V, together with the distribution of volume in different quality stands. The section of the table on standard lumber logs is most directly related to the purpose of this study. The distribution of the 1957 volume of approximately 1,870 million board feet of standard lumber logs shows the woods-run volume to be about 4 per cent

in grade 1 logs, 20 per cent in grade 2, and 75 per cent in grade 3. On a selective logging basis which excludes logs in poor stands, the distribution among standard lumber log grades is about 9 per cent in grade 1, 44 per cent in grade 2, and 47 per cent in grade 3. These factors emphasize again the need for purposeful buying and logging practices to avoid poor quality stands.

Table VI

HARDWOOD SAWTIMBER VOLUME IN THE REGION
BY SPECIES, 1957

Species	Million Board Feet
Black, scarlet, and southern red oaks	390. 0
Cherrybark, Shumard, and northern red oaks	107. 7
Water oaks	149. 9
White oak (Quercus alba)	328. 4
Other white oaks	213. 4
Pecan	16. 5
Other hickories	226. 3
Sweetgum	448. 8
Black and tupelo gums	163. 2
Cottonwood	25. 4
Willow	49. 9
Soft maples	23. 8
Yellow-poplar	86. 1
Sweetbay and magnolia	12. 8
White elm	40. 8
Other elms	53. 1
Ash	61. 9
Hackberry	26. 0
Beech	25. 8
Sycamore	55. 4
Other hardwoods	23. 7
Total	2, 528. 9

Source: (See Source, Table I), Table 24, p. 42.

Volume Distribution by Species

Table VI gives valuable information in considerable detail as far as volume of sawtimber by species is concerned. The predominance of oaks and gums may be observed by the most casual viewer of species

and respective volume quantities. Likewise, this table indicates the presence in significant volume of other species in good demand by the hardwood industry at the present time. These species include cottonwood, willow, maples, yellow-poplar, elms, ash, sycamore, and others. This quantity and mixture of hardwoods in an economy of growing scarcity should be an attractive source of supply to industrial consumers in the Mid-South.

Table VII

HARDWOOD SAWTIMBER VOLUME IN THE REGION
BY SPECIES AND TREE DIAMETER, 1957

(Million Board Feet)

Species	All Diameter Classes	10-12 Inches	14-18 Inches	20-24 Inches	26 Inches and up
Red oaks	647.6	144.1	354.8	106.2	42.5
White oaks	541.8	149.1	316.1	61.7	14.9
Hickory	242.8	66.5	117.7	51.8	6.8
Sweetgum	448.8	110.0	302.7	33.8	2.3
Black and tupelo gums	163.2	51.6	101.6	10.0	-
Other hardwoods	484.7	103.6	293.1	69.4	18.6
Total	2,528.9	624.9	1,486.0	332.9	85.1

Source: (See Source, Table I), Table 22, p. 38.

Species and Tree Diameter

Information on hardwood raw material supply as to species and tree diameter, shown in Table VII, should be of great value to industrial consumers who have rigid technical log specifications and who must of necessity be selective in procurement. Quantities in this table, shown in board feet, should be of interest to purchasers of standard logs for lumber.

Again, the preponderance of oaks and gums of all diameter classes is reflected in this tabulation. However, there is some evidence of a greater portion of trees 20 inches and above in diameter among the

oaks than among the gums. This characteristic is especially strong in the contrast between the red oak and the sweetgum species. The sweetgums tend to be smaller than the red oaks.

The diameter distribution of trees in the area by species suggests that commercial users of large and prime red oaks in the manufacture of flooring and other industrial products may do well to examine this forest area carefully as a potential source of supply. Likewise, users of medium-to-large size white oaks for flooring and veneer manufacture and of medium-to-small size sweetgums for pulp may find the area to be a desirable long-run source of supply. The area appears reasonably attractive for users of prime logs between 14 and 24 inches in diameter in the oak and gum species.

Species and Stand Size

The geographical dispersion of trees in the area and the uniformity of trees within stands are of interest to the logger. In addition, the large hardwood manufacturer is interested in the age and stand size distribution of the various species as an indication of long-run supply prospects. Evidence of these characteristics is indicated or implied by the information in Table VIII.

Table VIII

HARDWOOD SAWTIMBER VOLUME IN REGION
BY SPECIES AND STAND SIZE, 1957

(Million Board Feet)

Species	All Stand Sizes	Large Saw-timber	Small Saw-timber	Pole Timber	Seedling and Sapling	Nonstocked and Other Areas
Red oaks	647.6	141.8	178.6	244.7	81.5	1.0
White oaks	541.8	85.7	187.7	189.9	74.7	3.8
Hickory	242.8	17.9	82.1	118.6	24.2	-
Sweetgum	448.8	105.5	194.1	110.5	38.7	-
Black and tupelo gums	163.2	48.5	72.2	29.2	13.3	-
Other hardwoods	484.7	139.4	186.9	106.7	51.7	-
Totals	2,528.9	538.8	901.6	799.6	284.1	4.8

Source: (See Source, Table I), Table 23, p. 40.

The first observation is that the information in this table seems to contradict that in Table VII. The previous table shows the proportion of trees in the greatest diameter size to be in the red oak species, while the heavy proportion of sweetgums was in the direction of small diameter trees. The surface implication of Table VIII is that the greatest relative volume of oak sawtimber is to be found in the pole timber stands while the gums are more evenly distributed among the large, small, and pole stands.

Further study of the information in this table, however, seems to suggest very strongly that the large-diameter oaks, though greater in number, are more dispersed among the small trees than the gums. This is especially true in the case of the white oaks. The large gums seem to be more concentrated in groves which grow in upland river bottoms and other areas. The stand per acre of large gum sawtimber is probably in excess of that of large oaks.

The logger who is willing to search for concentrations of large red oaks and sweetgums in the Region should be able to operate on an efficient and competitive basis for a long time. Technically, large sawtimber stands are those with trees having a minimum net volume per acre of 1,500 board feet and at least half of this volume in trees 15 inches in diameter and larger. This is well above the minimum for efficient and economical logging with modern techniques.

The long-run supply prospects of all species in the area appear to be favorable because of relatively high volume in pole timber and seedling and sapling stands.

Location by Species and County

Information on the location of hardwood sawtimber is of considerable value to the prospective buyer, especially the concentration yard or large mill owners outside the production area and unfamiliar with existing timber conditions. Detailed information on location of hardwood in the area by county and species is shown in Table IX. The soft hardwood classification includes the cottonwood, sweetgum, yellow-poplar, and like species; while the other hard hardwood classification includes ash, hickory, sycamore, and similar species. Marshall County seems to be the leading county in soft hardwoods in the area, Lafayette County, in oaks; and De Soto County, in other hardwoods. The geographical distribution of each of these species classes of hardwood sawtimber volume is shown in Maps 1, 2, and 3.

Table IX

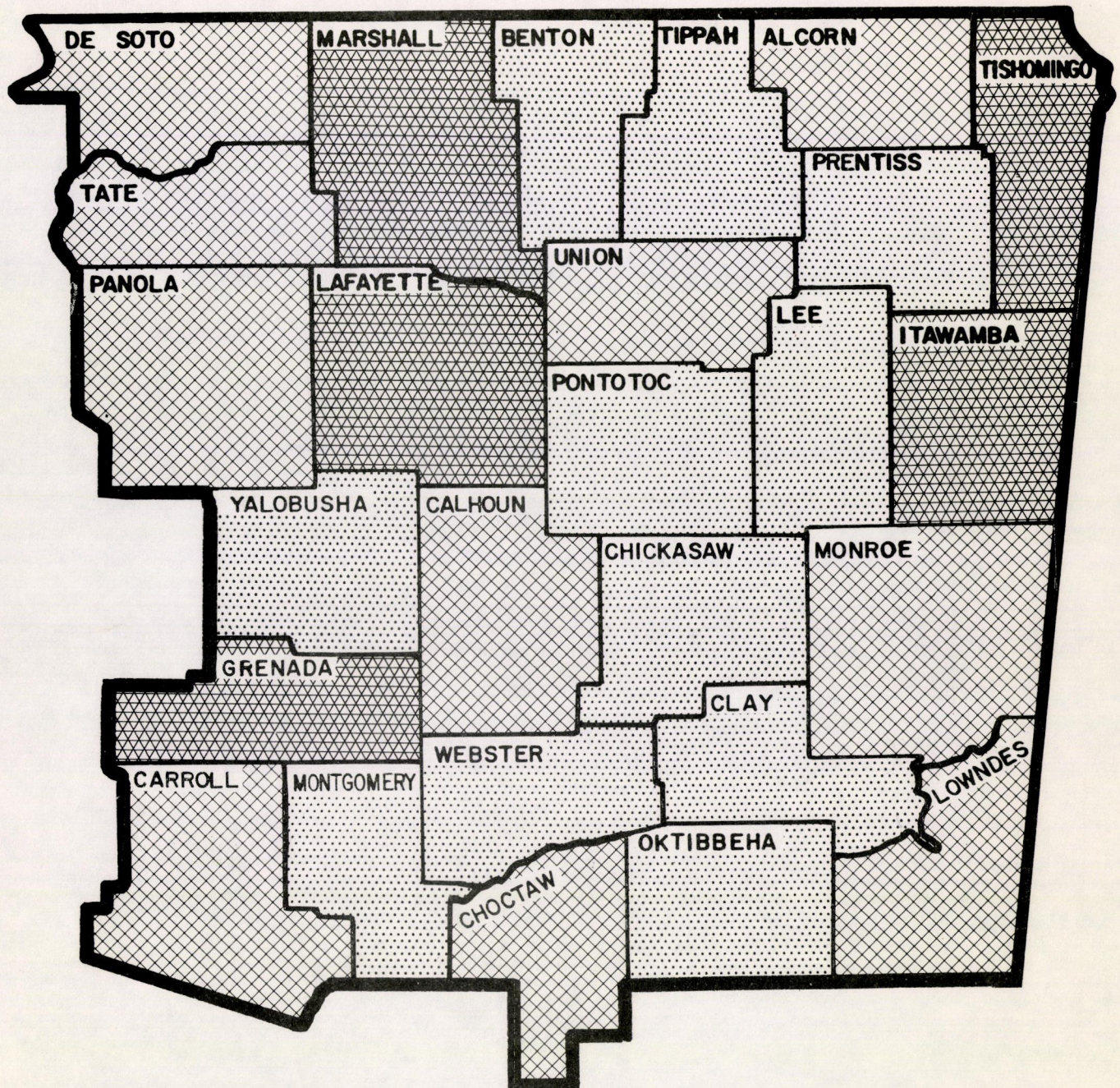HARDWOOD SAWTIMBER VOLUME BY SPECIES AND COUNTY, 1957

(Million Board Feet)

County	Total Hardwoods	Soft[a] Hardwoods	Oaks	Other hard[b] Hardwoods
Alcorn	81.4	31.0	36.1	14.3
Benton	69.3	24.6	38.9	5.8
Calhoun	142.5	48.7	71.7	22.1
Carroll	169.3	44.7	84.0	40.6
Chickasaw	27.8	2.9	19.8	5.1
Choctaw	49.0	28.1	18.0	2.9
Clay	172.9	15.7	116.9	40.3
De Soto	124.7	41.8	36.1	46.8
Grenada	102.9	52.0	28.2	22.7
Itawamba	152.0	77.6	31.3	43.1
Lafayette	267.7	61.7	160.1	45.9
Lee	27.2	3.0	16.9	7.3
Lowndes	80.9	31.4	25.0	24.5
Marshall	208.1	88.2	98.4	21.5
Monroe	100.5	29.1	48.5	22.9
Montgomery	47.9	4.1	29.1	14.7
Oktibbeha	45.0	2.5	34.1	8.4
Panola	88.5	31.9	36.4	20.2
Pontotoc	47.5	6.9	20.8	19.8
Prentiss	41.9	10.4	26.6	4.9
Tate	80.3	48.4	4.7	27.2
Tippah	78.5	23.6	42.1	12.8
Tishomingo	124.6	54.8	52.4	17.4
Union	88.1	42.0	33.7	12.4
Webster	36.2	8.8	25.2	2.2
Yalobusha	74.2	10.0	54.4	9.8
Total	2,528.9	823.9	1,189.4	515.6

[a]Includes cottonwood, sweetgum, yellow-poplar, and the like.
[b]Includes ash, hickory, sycamore, and the like.

Source: (See Source, Table I), Table 21, p. 36.

MAP I. SOFT HARDWOOD SAWTIMBER,
NORTH MISSISSIPPI SURVEY REGION, 1957
(Million Board Feet)

DE SOTO

MARSHALL

BENTON

TIPPAH

ALCORN

TISHOMINGO

TATE

PRENTISS

PANOLA

LAFAYETTE

UNION

LEE

ITAWAMBA

PONTOTOC

YALOBUSHA

CALHOUN

CHICKASAW

MONROE

GRENADA

CLAY

WEBSTER

CARROLL

MONTGOMERY

LOWNDES

OKTIBBEHA

CHOCTAW

50 and over

25 — 49

Under 25

Source: Table IX

MAP 2. OAK SAWTIMBER, NORTH MISSISSIPPI SURVEY REGION, 1957
(Million Board Feet)

DE SOTO

MARSHALL

BENTON

TIPPAH

ALCORN

TISHOMINGO

TATE

PRENTISS

PANOLA

LAFAYETTE

UNION

LEE

ITAWAMBA

PONTOTOC

YALOBUSHA

CALHOUN

CHICKASAW

MONROE

GRENADA

CLAY

WEBSTER

LOWNDES

CARROLL

MONTGOMERY

OKTIBBEHA

CHOCTAW

Over 100

25 – 49

75 – 100

Under 25

50 – 74
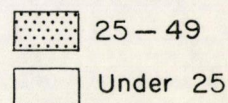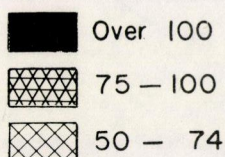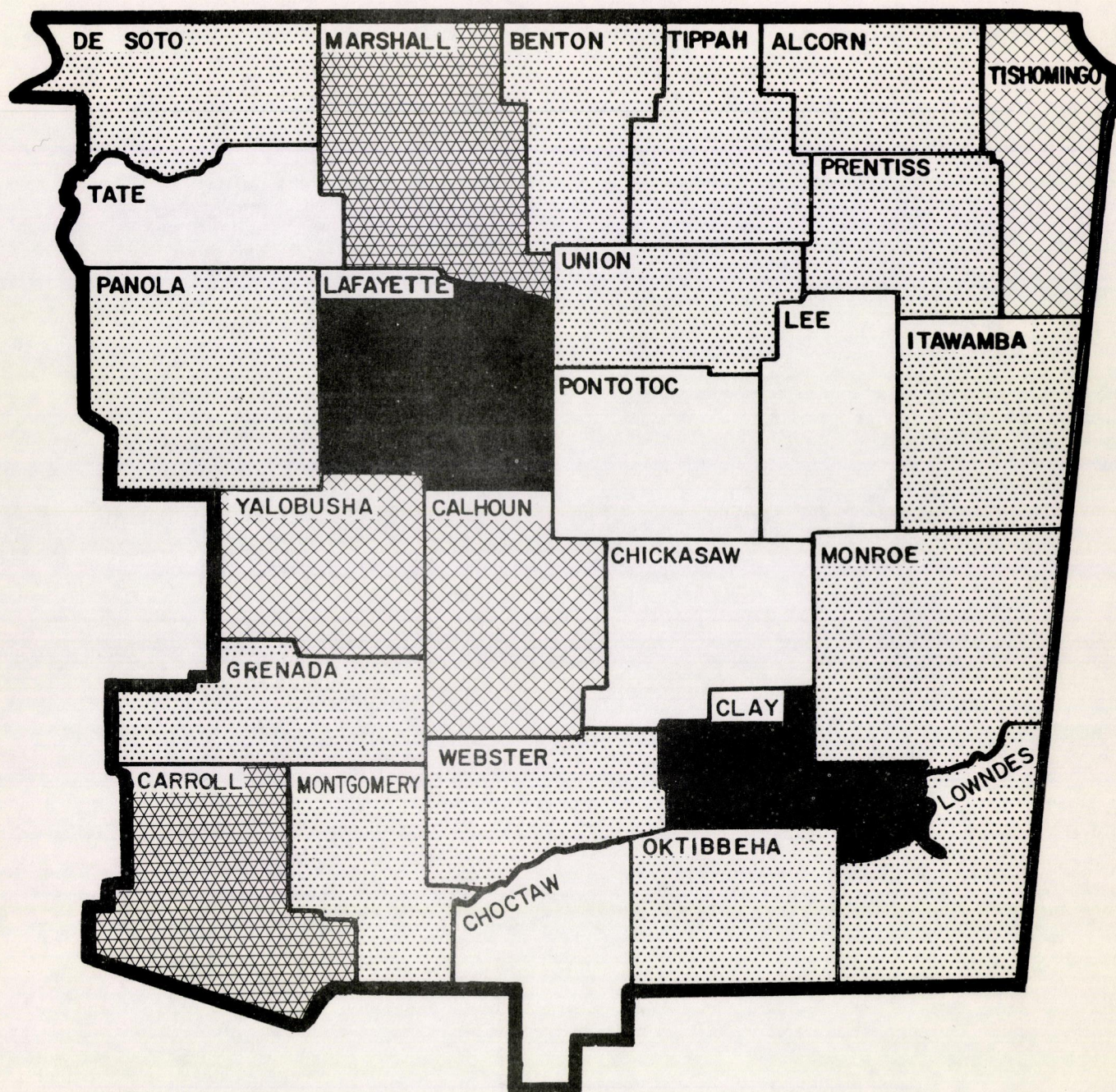
Source: Table IX

MAP 3. OTHER HARD HARDWOOD SAWTIMBER, NORTH MISSISSIPPI SURVEY REGION, 1957
(Million Board Feet)

DE SOTO

MARSHALL

BENTON

TIPPAH

ALCORN

TISHOMINGO

PRENTISS

TATE

PANOLA

LAFAYETTE

UNION

LEE

ITAWAMBA

PONTOTOC

YALOBUSHA

CALHOUN

CHICKASAW

MONROE

GRENADA

CLAY

WEBSTER

LOWNDES

CARROLL

MONTGOMERY

OKTIBBEHA

CHOCTAW

40 and over

20 — 29.9

10 — 19.9

Under 10
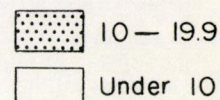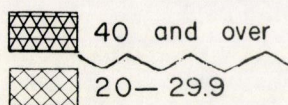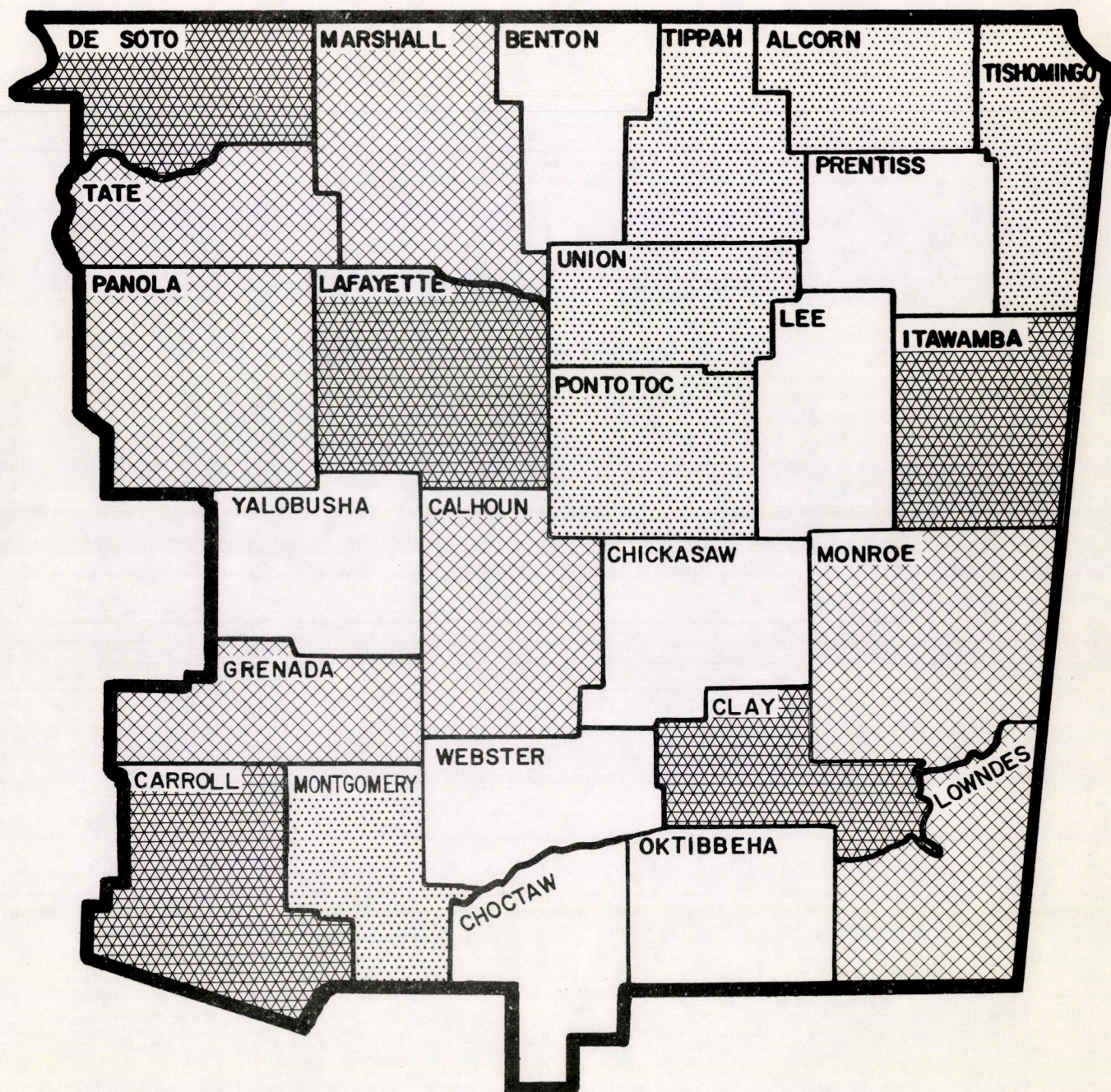
Source: Table IX

2. GROWING STOCK OF HARDWOOD SAWTIMBER

Because of the growing scarcity of hardwood supplies, the long-run prospects of the Region as a potential source of future hardwood supply should be of interest to those who have logging and manufacturing investments in the area and others who have established supply channels drawing resources from the area. This section attempts to provide some information on this subject by presenting quantities of growing stock by species, stand size, and counties. Growing stock is defined as "Net volume in cubic feet of live sawtimber and live poletimber trees from stump to a minimum 4.0-inch top diameter (of central stem) inside bark."[1] It excludes salvable dead sawtimber and cull trees.

Distribution by Species

Table X shows the distribution of hardwood growing stock by species in the area; this is of particular value to prospective purchasers with technical-species raw material requirements. Of course, oaks and gums are the most dominant species in the area and they are likely to continue to occupy that position for a long time. Other species existing in significant quantities are willow, yellow-poplar, elms, ash, and sycamore.

Of special interest is the trend in quantities of growing stock by species during the 10-year period prior to 1957. The quantity of black, scarlet, and southern red oaks decreased during the period, while that of cherrybark, Shumard, and northern red oaks almost doubled. Also, the white oak (Quercus alba) registered an increase, while other white oaks remained about the same. Relatively high percentage rates of growth occurred in black and tupelo gums, yellow-poplar, sweetbay and magnolia, ash, and hackberry.

Distribution by Species and Stand Size

The distribution of growing stock by stand size affects economies of present and future harvesting operations. Such a distribution helps to identify the degree of concentration of growing stock in large sawtimber stands which is consistent with the purpose of this study. High concentration in large stands tends to reduce logging and transportation costs of the most valuable trees. These are the trees which probably will flow to the more distant markets and command the higher prices.

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[1] _Mississippi Forests_, Forest Survey Release 81 (New Orleans: Southern Forest Experiment Station, 1958), p. 19.

Table X

HARDWOOD GROWING STOCK BY SPECIES
IN THE NORTH MISSISSIPPI SURVEY REGION, 1948 and 1957

(Million Cubic Feet)

Species	1946-48	1957
Black, scarlet, and southern red oaks	145.0	141.4
Cherrybark, Shumard, and northern red oaks	20.8	36.7
Water oaks	54.5	61.4
White oaks (Quercus alba)	82.0	117.9
Other white oaks	110.2	111.3
Pecan	.9	4.7
Other hickories	87.8	98.8
Sweetgum	167.2	189.8
Black and tupelo gums	25.4	61.9
Cottonwood	4.5	6.0
Willow	17.1	20.6
Soft maples	9.4	13.5
Yellow-poplar	14.1	26.9
Sweetbay and magnolia	1.2	6.2
White elm	(30.6)	15.0
Other elms		22.4
Ash	8.0	30.5
Hackberry	4.7	10.3
Beech	8.8	7.5
Sycamore	16.3	17.5
Other hardwoods	10.2	17.0
Total	818.7	1,017.4

Source: 1957 from (See Source, Table I), Table 15, p. 30.
1946-48 from Mississippi Forest Resources and Industries,
Forest Resource Report No. 4, U. S. Dept. of Agriculture,
Forest Service, Table 17, p. 73.

Table XI shows that about 13 per cent of the red oaks are concentrated in large sawtimber stands. This means that 13 per cent of these trees are to be found in stands containing 1,500 board feet per acre as a minimum and at least half this volume 15 inches in diameter or larger. About 10 per cent of the white oaks are in the large stands, 5 per cent of the hickory, 14 per cent of the sweetgum, 23 per cent of black and tupelo gums, and 20 per cent of other hardwoods. Obviously, the black and tupelo gums and other hardwoods are the most highly concentrated species in the large timber stands.

Table XI

GROWING HARDWOOD STOCK BY SPECIES
AND STAND SIZE IN THE NORTH MISSISSIPPI SURVEY REGION, 1957

(Million Cubic Feet)

Species	All Stand Sizes	Large Saw-timber	Small Saw-timber	Pole Timber	Seedings and Saplings	Nonstocked and Other Areas
Red oaks	239.5	31.1	45.7	126.3	36.1	.3
White oaks	229.2	23.5	58.1	115.3	31.4	.9
Hickory	103.5	5.6	29.6	56.1	12.2	-
Sweetgum	189.9	26.2	56.7	77.1	29.5	.4
Black and tupelo gum	61.9	14.3	22.3	19.1	6.2	-
Other hardwoods	193.4	38.6	61.9	69.7	22.8	.4
Total	1,017.4	139.3	274.3	463.6	138.2	2.0

Source: (See Source, Table I), Table 17, p. 32.

Perhaps, a more significant characteristic of growing stock is the distribution of species within the large timber stands in which there were 139.3 million cubic feet in 1957. Of this amount, about 22.3 per cent is of red oak species; 16.9 per cent, white oak; 4.0 per cent, hickory; 18.8 per cent, sweetgum; 10.3 per cent, black and tupelo gum; 27.7 per cent, other hardwoods.

Geographical Distribution by County and Species

Geographical distribution of growing stock in the area is very helpful in making future estimates of location of volume by species. The distribution of growing stock by species and county is shown in Table XII. Again, Lafayette County appears to be the leading county in total hardwoods with Clay and Carroll Counties not far behind. Marshall County is the center of soft hardwoods with Carroll and Itawamba Counties holding second and third places, respectively. Lafayette, Clay, and Carroll are the leading counties in volume of oak growing stock. Itawamba, Clay, and De Soto Counties seem to contain the highest quantities of other

hard hardwoods. To the extent that volume of growing stock is an indication of future potential sawtimber, Lafayette County is likely to be the chief source of general hardwood supply in the area because of its leading position in the oak species. Likewise, Marshall County will be the principal source of soft hardwoods with Itawamba and Lafayette showing good growth potentials. Clay County shows strong growth potentials in oaks along with Lafayette. In other hard hardwoods, Itawamba and Clay are the heavy future producing areas.

Table XII

GROWING STOCK VOLUME OF HARDWOOD
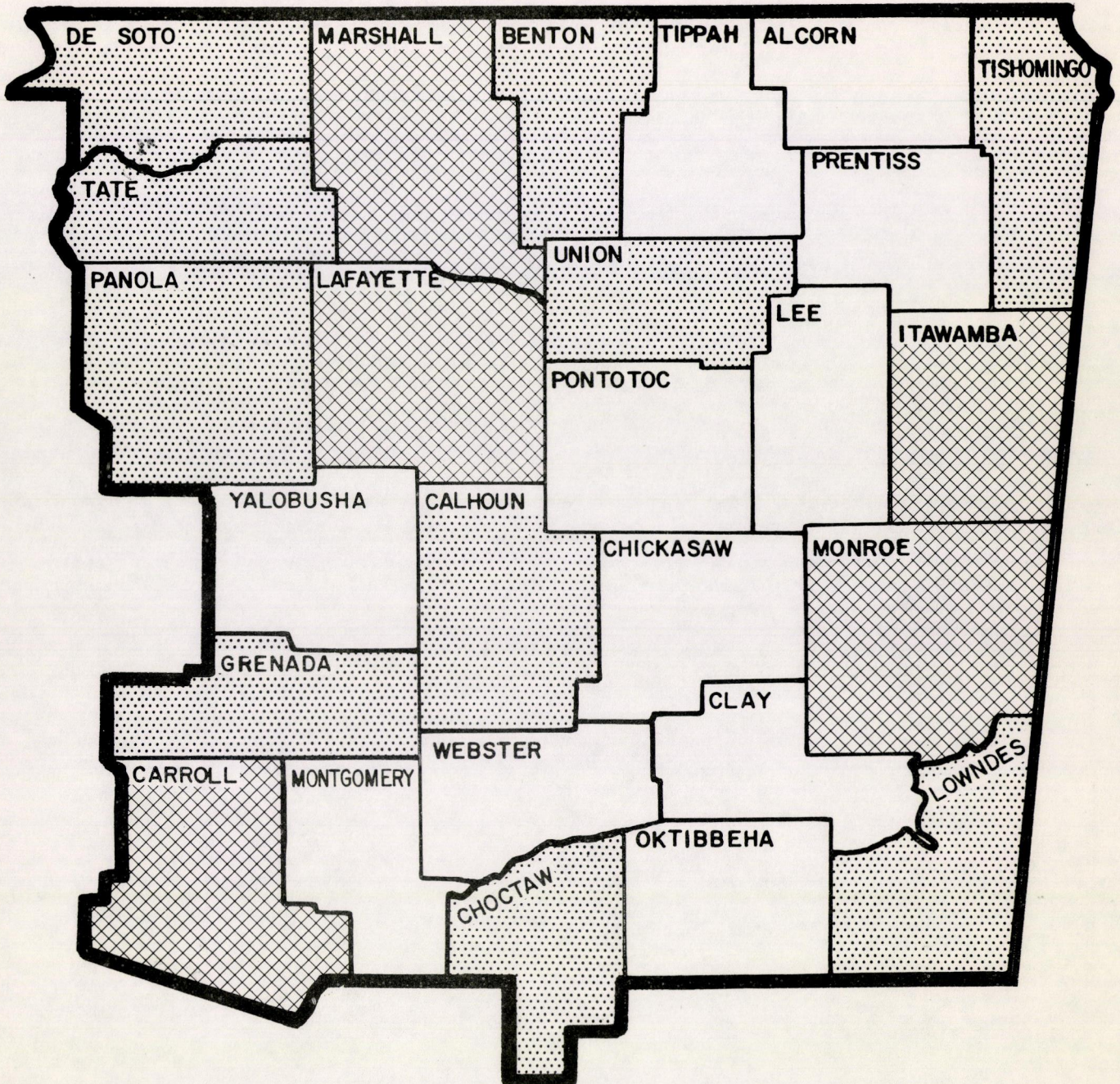BY SPECIES AND COUNTY WITHIN THE REGION, 1957

(Million Cubic Feet)

County	Total Hardwoods	Soft[a] Hardwoods	Oaks	Other Hard[b] Hardwoods
Alcorn	32.5	9.3	16.2	7.0
Benton	38.7	11.8	19.0	7.9
Calhoun	43.3	13.5	21.9	7.9
Carroll	63.0	23.4	27.2	12.4
Chickasaw	18.9	3.0	12.4	3.5
Choctaw	28.5	12.5	13.3	2.7
Clay	69.1	9.2	44.8	15.1
De Soto	41.6	15.8	10.9	14.9
Grenada	35.0	14.9	10.5	9.6
Itawamba	54.8	22.8	16.8	15.2
Lafayette	78.6	21.2	45.1	12.3
Lee	9.2	1.5	4.9	2.8
Lowndes	41.2	15.1	14.7	11.4
Marshall	60.7	29.2	23.6	7.9
Monroe	58.9	21.3	26.9	10.7
Montgomery	22.4	6.0	12.1	4.3
Oktibbeha	32.3	3.1	23.8	5.4
Panola	33.0	14.0	11.5	7.5
Pontotoc	24.5	4.5	10.0	10.0
Prentiss	23.8	6.9	13.4	3.5
Tate	33.3	14.7	4.7	13.9
Tippah	36.6	9.8	19.5	7.3
Tishomingo	40.7	17.0	17.4	6.3
Union	36.4	18.4	11.9	6.1
Webster	23.6	5.7	13.1	4.8
Yalobusha	36.8	9.2	23.1	4.5
Total	1,017.4	333.8	468.7	214.9

[a]Includes cottonwood, sweetgum, yellow-poplar, and the like.
[b]Includes ash, hickory, sycamore, and the like.

Source: (See Source, Table I), Table 20, p. 34.

MAP 4. SOFT HARDWOOD GROWING STOCK, NORTH MISSISSIPPI SURVEY REGION, 1957
(Million Cubic Feet)

DE SOTO MARSHALL BENTON TIPPAH ALCORN TISHOMINGO
TATE PRENTISS
PANOLA LAFAYETTE UNION LEE ITAWAMBA
PONTOTOC
YALOBUSHA CALHOUN CHICKASAW MONROE
GRENADA CLAY
CARROLL MONTGOMERY WEBSTER LOWNDES
OKTIBBEHA
CHOCTAW

20 and over

10 — 19

Under 10

Source: Table XII

MAP 5. OAK GROWING STOCK,
NORTH MISSISSIPPI SURVEY REGION, 1957
(Million Cubic Feet)
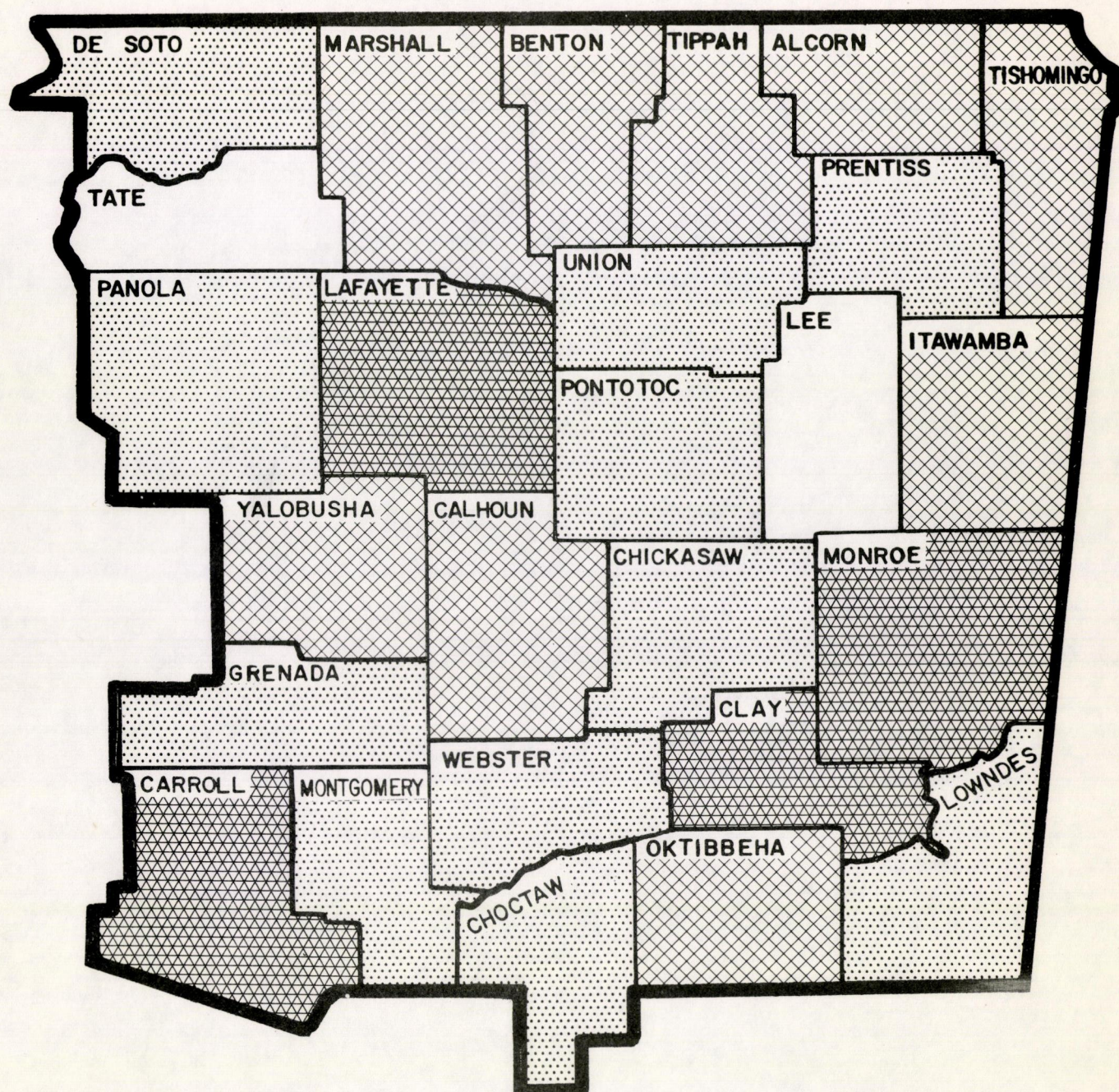
Over 25

16—25

10—15

Under 5

Source: Table XII

MAP 6. OTHER HARD HARDWOOD GROWING STOCK, NORTH MISSISSIPPI SURVEY REGION, 1957
(Million Cubic Feet)

DE SOTO	MARSHALL	BENTON	TIPPAH	ALCORN	TISHOMINGO
TATE				PRENTISS	
PANOLA	LAFAYETTE	UNION		LEE	ITAWAMBA
		PONTOTOC			
YALOBUSHA	CALHOUN	CHICKASAW		MONROE	
GRENADA	WEBSTER	CLAY			LOWNDES
CARROLL	MONTGOMERY	CHOCTAW	OKTIBBEHA		

Over 15

5—15

Under 5

Source: Table XII
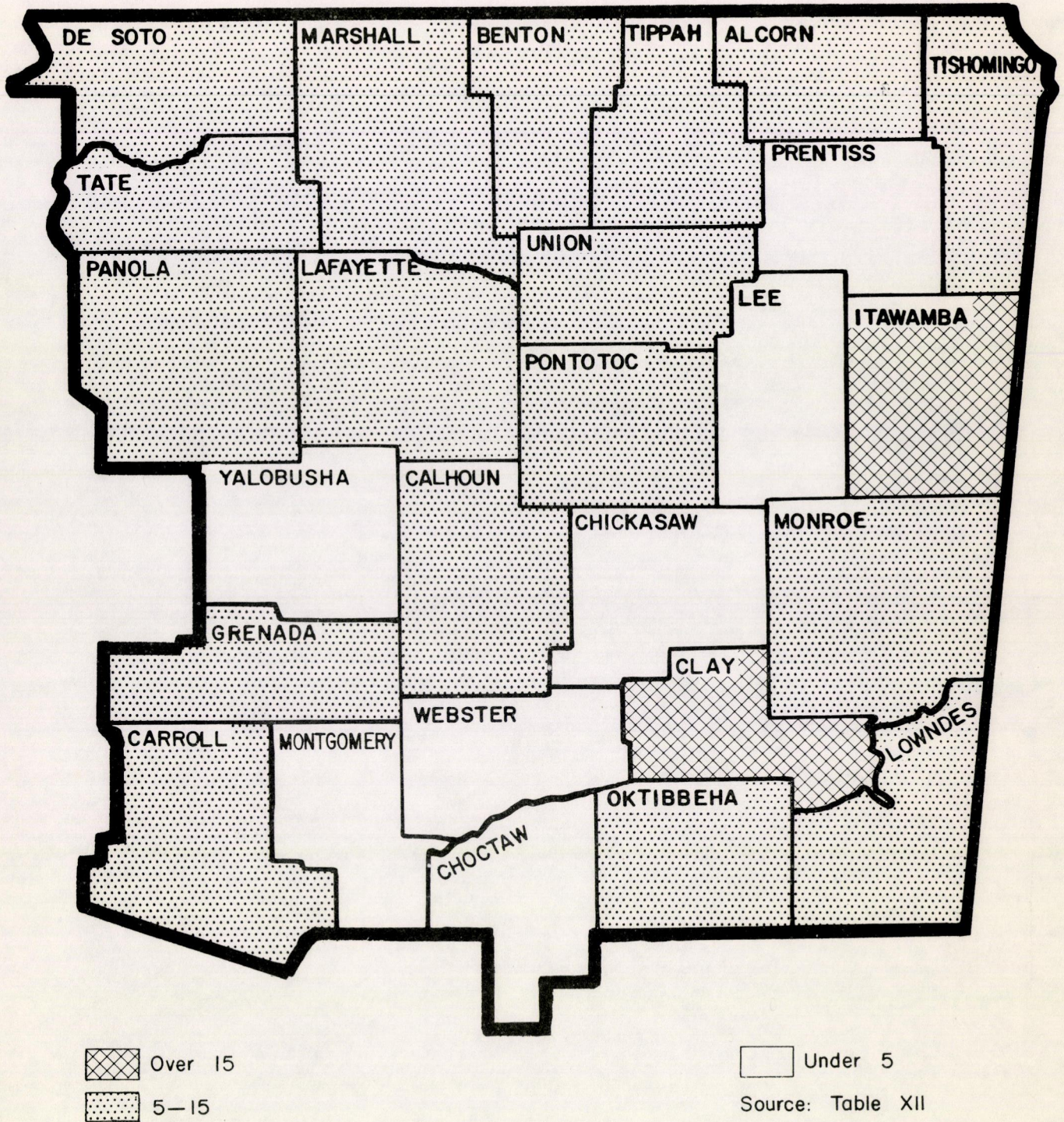
3. HARVESTING HARDWOOD GROWING STOCK IN THE REGION

The industry or product direction in which raw material flows to market is always of interest to industrial consumers of such materials existing in rival demand. The ultimate use of the raw material depends upon such factors as the quality of the material itself, relative input requirements of and prices offered by different consumers, and accessibility and knowledge of different markets.

The hardwood resources of this Region are similar to other raw materials in that they do tend to flow to the most profitable markets available and known to the owners thereof. The purpose of this section of the study is to present information on the multiple uses of hardwood resources in the area and to invite the interest of buyers who may make the most efficient, productive, and profitable use of this resource.

Annual Cut of Growing Stock

Annual cut of growing stock in the Region in 1956 is shown in Table XIII. This is one year prior to the last forest survey and does not affect other quantities reported in that survey. Annual cut of growing stock is the net volume of live sawtimber and poletimber trees cut or killed by logging, or by cultural operations, on commercial forest land during a particular year.[2]

It is obvious that the heavy cutting of growing stock for all purposes occurred in Panola, Carroll, and Lowndes Counties. Likewise, the greatest volumes of hardwood sawtimber were cut in these same counties in 1956. Factors other than availability of growing stock account for the heavy cutting in those areas. With the exception of Carroll County, with its high volume of growing stock, these are not areas where supply is most abundant. Factors such as transportation facilities and nearness to sawmills probably account for the cutting activity.

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[2]Ibid., p. 19.

Table XIII

HARDWOOD GROWING STOCK VOLUME, BY COUNTY, 1957, AND ANNUAL CUT WITHIN
THE REGION: AMOUNT AND PER CENT OF GROWING VOLUME, AND PER
CENT OF CUT FOR PULPWOOD, BY COUNTY, 1956

County	Total Hardwood Growing Volume, 1957 (million cu. ft.)	Total Hardwood Cut, 1956		
		Amount (million cu. ft.)	As Per Cent of Growing Volume	Per Cent Cut for Pulpwood
Alcorn	32.5	1.9	5.85	5.92
Benton	38.7	0.9	2.33	1.39
Calhoun	43.3	2.4	5.54	6.01
Carroll	63.0	3.4	5.40	16.45
Chickasaw	18.9	2.4	12.70	16.41
Choctaw	28.5	2.9	10.18	24.35
Clay	69.1	1.9	2.75	3.26
De Soto	41.6	1.9	4.57	13.72
Grenada	35.0	2.1	6.00	12.98
Itawamba	54.8	1.5	2.74	-
Lafayette	78.6	2.7	3.44	19.07
Lee	9.2	1.2	13.04	.24
Lowndes	41.2	3.2	7.77	.06
Marshall	60.7	2.2	3.62	3.87
Monroe	58.9	2.8	4.75	2.22
Montgomery	22.4	2.2	9.82	20.55
Oktibbeha	32.3	1.9	5.88	22.59
Panola	33.0	3.5	10.61	6.81
Pontotoc	24.5	1.7	6.94	14.71
Prentiss	23.8	1.1	4.62	6.37
Tate	33.3	1.6	4.80	4.64
Tippah	36.6	1.8	4.92	3.87
Tishomingo	40.7	2.7	6.63	7.04
Union	36.4	1.7	4.67	3.75
Webster	23.6	2.6	11.02	19.10
Yalobusha	36.8	2.2	5.98	26.36
Total	1,017.4	56.4	5.54	10.83

Source: (See Source, Table I): Growing Volume, Table 20, p. 34; 1956 cut, Table 29, p. 44.

Table XIV

ROUND PULPWOOD PRODUCTION FROM HARDWOOD
IN THE REGION BY COUNTY, 1955, 1956, and 1958

(Standard Cords)

County	1955	1956	1958
Alcorn	2,533	1,715	1,429
Benton	-	191	181
Calhoun	736	2,200	2,059
Carroll	8,707	8,525	9,294
Chickasaw	328	6,044	1,429
Choctaw	18,361	10,766	6,909
Clay	9	945	2,039
De Soto	688	3,974	2,760
Grenada	7,292	4,154	4,079
Itawamba	-	-	47
Lafayette	2,942	7,848	2,431
Lee	-	44	427
Lowndes	13	30	1,756
Marshall	389	1,297	3,841
Monroe	107	947	953
Montgomery	12,739	6,892	6,697
Oktibbeha	7,658	6,543	4,032
Panola	1,454	3,632	2,895
Pontotoc	74	3,811	1,120
Prentiss	-	1,068	956
Tate	177	1,131	116
Tippah	-	1,061	591
Tishomingo	2,955	2,899	1,223
Union	-	973	2,635
Webster	5,183	7,569	4,488
Yalobusha	3,991	8,841	5,411
Total	76,336	93,100	69,798

Source: 1955 from Mississippi Forest Industries Committee, Mississippi Forest Facts (Jackson, Miss.: 1957),
p. 9.
1956 from Christopher, J. F., and Nelson, M. E., 1956 Pulpwood Production in the South, Forest
Survey Release 80 (New Orleans: Southern Forest Experiment Station, August, 1957), Table 9, p. 9.
1958 from Christopher and Nelson, Southern Pulpwood Production, 1958, Forest Survey Release 82,
(New Orleans: Southern Forest Experiment Station, 1959), Table 14, p. 16.
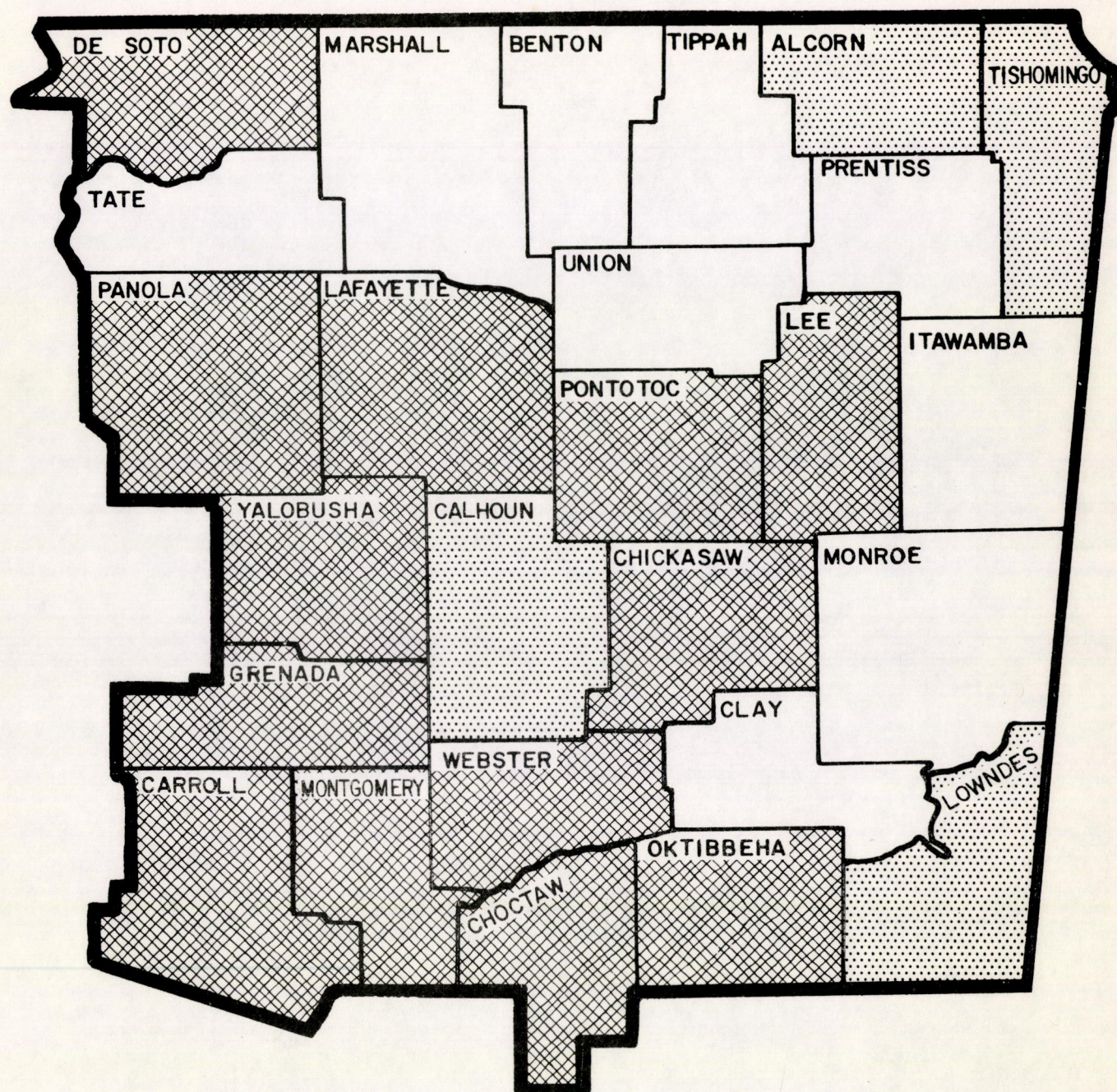
Pulpwood Production

Table XIV shows the distribution of round pulpwood production in the Region from hardwood stands among the counties for the years 1955, 1956, and 1958. There seems to be a tendency for the center of this activity to remain in the same general vicinity from year to year with some exceptions. Again, the source of supply does not appear to be the chief determinant of location of pulpwood production. There are indications in this situation that the interest, actions, and organized efforts of the purchasing firms are very important causes of production in and outside the principal supply areas. The selection of alternative markets for hardwood in the area does not appear to be as much the result of differences in supply and prices as it is a question of availability of alternative markets and transportation facilities. For example, a high percentage of growing stock cut in Carroll, Chickasaw, Choctaw, Lafayette, Montgomery, Oktibbeha, Webster, and Yalobusha Counties goes into pulpwood (Table XIII). A reasonable conclusion is that rail transportation facilities in these areas are reasonably good and, perhaps, non-pulpwood markets are not available. On the other hand, pulpwood production in Benton, Clay, Lee, Lowndes, Marshall, Monroe, Panola, Prentiss, and Union Counties represents a small portion of growing hardwood stock cut in 1956. Apparently, there are active non-pulpwood markets for hardwood in those counties.

Greater detail on the location of competitive conditions in the use of hardwood growing stock is shown in Map 7. Degree of competition is estimated on the basis of percentage of 1957 growing stock cut in 1956 and the percentage of the annual cut used for pulpwood during the same year. It is recognized that the ratio of annual cut to growing volume is weakened by the necessity of using quantities for two different years. More comparable figures are not available. However, the margin of error is slight because annual cut is about equal to annual growth in volume. Instances in which the ratios of annual cut to growing volume and pulpwood usage to annual cut exceed the averages for the area as indicated in Table XIII are assumed to suggest heavy competition from both sawtimber and pulpwood buyers. Such areas are shown on the map as areas of heavy competition. Where the ratios are about equal to the averages, competition is regarded as normal. Areas in which the ratios are less than the average are shown as areas of light competition.

It is significant for plant location purposes that there does not seem to be a precise relationship between areas of greatest supply and of heaviest competition. For example, Clay, Itawamba, Marshall, and Monroe

Counties appear to be areas of good supply of hardwood growing stock and of light competition. Production

of hardwood is more closely associated with transportation facilities and competitive buying than with resource

location. Relocation of production facilities and market activity would tend to improve efficiency in utili-

zation of hardwood and promote the general welfare.

MAP 7. DEGREE OF RELATIVE COMPETITION FOR HARDWOOD, NORTH MISSISSIPPI SURVEY REGION, 1957

DE SOTO

MARSHALL

BENTON

TIPPAH

ALCORN

TISHOMINGO

TATE

PRENTISS

PANOLA

LAFAYETTE

UNION

LEE

ITAWAMBA

PONTOTOC

YALOBUSHA

CALHOUN

CHICKASAW

MONROE

GRENADA

CLAY

WEBSTER

LOWNDES

CARROLL

MONTGOMERY

OKTIBBEHA

CHOCTAW

Heavy

Average

Light

Source: Based on cols. 3 and 4, Table XIII

4. SUMMARY AND CONCLUSIONS

This chapter has been concerned with the supply of hardwood resources in the North Mississippi Survey Region, an area comprising 26 counties. The purpose has been to bring to the attention of potential buyers of high-quality logs significant characteristics of the Region and its forests which may aid them in evaluating the Region as to both short-run and long-run supply. Volume of sawtimber has been identified on the basis of species, stand quality and size, tree diameter, and county. For the purpose of making long-run evaluations, growing stock has been identified on the basis of species, stand size, and county. Harvesting operations have been analyzed as to annual cut and pulpwood production of growing stock and sawtimber by counties. By implication, areas of market activity have been identified on the basis of degree of competitive buying by counties and alternative uses of hardwood.

Oaks and gums are the most predominant species in the area. Oaks appear to be widely scattered and to vary in quality and size. White oaks and all "other hardwoods" seem to be more closely grouped into larger tree stands in the upland river bottoms and on the western edge of the famous Bluff Hills.

Great quantities of hardwood are going into pulpwood. This seems to be a very strong development in areas away from sawmill locations where competition is limited.

This combination of characteristics of the hardwood forest seems to suggest an aggressive and selective procurement approach in order to avoid high costs of logging and transportation and to assure quality.

CHAPTER III

THE MARKETING OF FOREST PRODUCTS OF THE REGION

The marketing procedures employed in moving products of the forest from points of origin of the raw material (timber) to the final consumer vary with the operations required to cut, assemble, select, transport, and process the material for the different end uses. Often, the decision is made as to the final use of the material prior to the cutting of the tree. From that point on, the harvesting and marketing procedures diverge. For example, timber destined for lumber use is cut into logs, skidded or otherwise collected at convenient truck trails, and transported to a nearby sawmill as a general practice. Logs for use in veneer manufacture originate in a similar manner but tend to move greater distances to veneer mills. Timber destined for use in manufacture of pulp, on the other hand, is cut into bolts which are transported to rail freight terminals for transporting long distances to pulp mills. Likewise, handle stock, specialty products, and fence posts first are cut into bolts and then moved to separate processing plants. In each of these harvesting procedures, form creating processes tend to take place very early.

The procedures employed in marketing the primary forest products of the Region have been described elsewhere.[1] Those procedures are not restated here; however, certain conclusions relevant to the purpose of this study are emphasized here. Studies show that, in the first place, logs do not move very far from the place of origin before being sawed into rough green lumber.[2] A good and valid reason for this practice is that about one-half of the weight is eliminated by converting logs into lumber and thus cutting the cost of transportation in half. Second, high-quality logs tend to move farther than lower quality logs before being converted into lumber. Third, hardwood logs tend to move greater distances when sold to owners of large manufacturing plants. Large sawmills have greater drawing power because of necessity and superior position. Small mills are very mobile and tend to locate near the timber supply and transport lumber instead of logs. Large mills are less mobile and are compelled to have logs transported to them. Fourth, logs possessing special qualities

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[1] A very good description of procedures used in marketing timber products in essentially the same area is contained in Timber Products Marketing in Northeast Mississippi by George M. Judson and George L. Switzer, Agricultural Experiment Station, State College, Mississippi, October, 1952.

[2] James, Lee M., Mississippi's Forest Resources and Industries, Forest Service, U. S. Department of Agriculture, Forest Resource Report No. 4, (Washington: U. S. Government Printing Office), p. 38.

tend to move greater distances than general-use logs. Mills which manufacture lumber for special products such as veneer and hardwood flooring from oaks; furniture dimension stock from white wood like ash, cottonwood, hackberry, and maple; and caskets from cypress are limited in their ability to make substitutions. They must purchase log requirements from large areas.

From the standpoint of the hardwood producer, the best sales approach is for him to seek the kind of buyers who have timber requirements most closely resembling the log grades and species he possesses. Usually, the log buyer who demands high-quality logs of limited species expects to pay the highest prices being offered in the market, while those demanding average-quality utility logs of all species cannot afford to pay a premium price. An important exception to this general statement is found in the case of buyers who have highly diversified manufacturing operations. Sometimes, large mills have multiple divisions for the manufacture of multiple products. For example, one company may have a veneer plant, hardwood flooring plant, dimension plant, and a construction timber plant all in the same general area and consolidated under the same management. Such a firm could utilize logs of almost all species and quality ranges. Likewise, such a firm should offer a wide variation in the purchase prices of hardwood logs. In the absence of a consolidated firm of this sort, the seller should contact many buyers and distinguish among them as to quality and species desired and price offered.

Whether or not the seller of hardwood logs can take advantage of the high price markets depends upon the quality, costs of logging and transportation, prices offered in the quality market, and the revenue prospects of selling in local markets or converting the timber into lumber or other products which can be marketed locally or in larger markets.

Quality of Logs

It is easily recognized, as stated above, that high-quality logs tend to move greater distances before being coverted into lumber or other products than do logs of poor quality. High-quality logs command the highest prices which allow them to bear the necessary high cost of transportation. Poor-quality logs must be converted near the source of supply to eliminate waste and low-grade lumber which does not command a price sufficiently high to absorb additional transportation costs. Therefore, only high-grade logs of species in greatest demand should be selected for sale in more distant markets where prices are expected to be higher than in the general-purpose markets.

Not so easily recognized is the question of what constitutes log quality. This involves the problem of selecting and grading and of separating logs by grades either before they are cut in the forest or at the local sawmills or log concentration yards. Log grading techniques have not been developed and standardized as well as lumber grading techniques. However, sufficient progress has been made in this direction to indicate that grading can be done, though imperfectly, with profitable results. As a guide in the marketing of hardwood logs in this Region, the hardwood log grades for standard lumber established by the Forest Products Laboratory[3] are described here briefly.

The Laboratory conducted "intensive mill studies to get basic relationships between surface characteristics of logs and the grades of lumber resulting from them."[4] A close correlation was found to exist between log characteristics and grade of lumber yields when the principles of grading hardwood _lumber_ were used in grading logs. (See specifications for hardwood log and lumber grades in Appendix II.)

As a result of these studies, three log grades were established on the basis of yield of "clear cuttings of a definite minimum size comprising a specified fraction of the area" of a minimum of three visualized faces of each log. These log grades are Log Grade 1, Log Grade 2, and Log Grade 3. Of course, other grading factors are used in the grading process. These include the character of interior defects, amount of cull, mineral stains, grub holes, worm holes, and bird pecks.

The grading system is based upon studies which correlated log grades with yield of lumber by grade. "For nearly all species...the yield of No. 1 Common and Better lumber in Log Grade 1 varies from 65 to 80 per cent; in Log Grade 2, from 40 to 64 per cent; whereas in Log Grade 3 the yield is from only 13 to 36 per cent."[5] Detailed tabulations listed by the Laboratory study make it possible to determine for a number of hardwood species the actual amount of lumber which will be produced, in board feet and by standard grade, from each log which has been classed by species, grade, and diameter. Furthermore, the current value of the log may be determined by multiplying the current market price of each lumber grade and species by the quantity of

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[3] _Hardwood Log Grades for Standard Lumber: Proposals and Results_ (Madison, Wis.: U. S. Department of Agriculture, Forest Service, Forest Products Laboratory), No. 1737, pp. 1-3.

[4] _Ibid._, p. 3.

[5] _Ibid._, p. 5.

such lumber in each log and adding the results. To avoid the necessity of determining the log scale and to standardize a problem of this sort, the standard trading unit of 1,000 board feet may be used in lieu of individual logs. To illustrate the usefulness of grading hardwood logs and computing the current lumber market value thereof, a few illustrations have been worked out and are shown in Table XV. These illustrations are based upon published wholesale market prices for hardwood lumber in Memphis as of Feb. 13, 1960.

Table XV

MARKET LUMBER VALUES OF HARDWOOD LOGS, GRADE 1,
BY DIAMETER AND SPECIES, MEMPHIS MARKET, FEB. 13, 1960

(Dollars Per Thousand Board Feet)

Diameter	Species	
	Sap Gum	Lowland Red Oak
13"	116.35	133.95
20"	97.52	140.43
29"	113.57	138.49
Average-13"-29"	115.26	136.53

Source: Computed from data in Hardwood Log Grades for Standard Lumber: Proposals and Results (Madison, Wisconsin: Hardwood Products Laboratory, 1953), No. 1737, and Hardwood Market Report, Feb. 13, 1960.

These are computed estimates of the market value of lumber which may be produced from hardwood logs of specified grade, species, and diameter range. In economic terms, these values represent estimated marginal value product of hardwood logs in 1,000 board feet units. Under severe competition among hardwood log buyers for manufacturing standard grades of lumber, purchase prices may expect to approximate these values even in the absence of changes in the wholesale prices of the lumber.

These values are not to be confused with current prices of hardwood of the given grade, species, and diameter in the Memphis market. Instead, they represent maximum values which could be paid under extreme conditions of limited supply and prevailing market conditions. In order to reduce these lumber value estimates to log value estimates, f.o.b. mill, the conversion costs of the manufacturer must be reckoned with.

Marketing Costs of Hardwood for Standard Lumber

During the trip from the timber owner to the wholesaler, hardwood passes through many processing and manufacturing operations, each of which tends to increase the value of the product by the creation of place, form, and time utilities. These operations, discussed below, are all necessary and all incur significant costs.

The transportation of hardwood logs, involving the creation of place utility, is of particular importance in the marketing of forestry products. If the timber is to be useful to the manufacturer, it must be removed from the forest and transported to the mill. It is an expensive operation in the marketing of logs because of great distances involved and the weight of the logs. Also, the logs tend to move from producer to manufacturer in a very irregular manner. The ownership of the land upon which timber grows is divided among many small individuals. Consequently, an important problem in the industry is that of assembling enough logs from widely scattered sellers to keep the manufacturing operation going. The first part of this task is usually done in logging operations. There the logs are grouped along ridges or truck trails where they may be picked up by small trucks and hauled to larger concentration yards and loaded on railroad cars, barges, or large trucks for transportation to the manufacturing center. In this Region no significant water transportation facilities are available for transporting hardwood logs to the Memphis area. Most of them are hauled by trucks. Of course, in the areas farthest away, rail transportation is used.

The creation of form utility, a part of the processing and manufacturing operations, involves the conversion of hardwood logs into woodpulp, lumber, plywood, ties, staves, or other specialty products. Grading is also an important part of the production process in the creation of form utility for hardwood. If the logs are to meet the specifications of manufacturers of different products, they must be graded, selected, and assembled in such a way as to meet those particular specifications. Grading, therefore, increases the form utility by letting the buyer know what he is getting. It assures him that he will get what he needs and will not have to pay for quality which he does not need. Grading of hardwood logs does not seem to have become universal in the Region nor in the Memphis market area despite the advantages thereof. However, the trend is in that direction.

Still another important aspect of the production of hardwood logs is the problem of timing the logging, transporting, and milling operations in such a way as to avoid building up unnecessary inventory at collecting centers and sawmills at certain times of the year and causing idle capacity because of inadequate supply at other times.

Heavy costs are incurred all along the line. The lumber manufacturer who buys rough lumber and converts it into a finished product such as hardwood flooring must grade, sort, dry, plane, cut, package, advertise, and ship the end product. Both fixed and variable costs are involved. Published records indicate that about 80 per cent of net sales income of one such company with assets in Memphis represents total operating costs of the manufacturer. The remaining 20 per cent represents selling cost and operating profit. These relationships suggest that, as a general rule and on the average, about 20 per cent of the value of finished hardwood products at wholesale prices represents non-operating costs and 80 per cent represents operating costs including the cost of purchasing hardwood logs or lumber.

Costs involved in creating hardwood utilities on the basis of 1,000 board feet of hardwood lumber, may be estimated as follows:

Sawmilling, lumber scale	$15.00
Logging, log scale	$ 7.00 to $10.00
Transporting, lumber scale	$ .20 per mile within 100-mile radius
Stumpage, log scale	$ 8.00 to $35.00
	(Woods-run average of $15.00)

No difficulty is involved in the use of two different scales in the above and similar subsequent tabulations. Anticipated benefit from over-run in lumber yield resulting from differences in log and lumber scale is absorbed in the stumpage price estimates.

The cost of obtaining hardwood lumber at a point 50 miles from Memphis, therefore, would amount to approximately $50.00 per thousand board feet when purchased on woods-run basis at $15.00 stumpage, and logged, milled, and transported on contract basis at the highest estimates. Total cost would vary with changes in distance and at the rate of $1.00 for each five miles. On a woods-run stumpage price basis, the cost would not vary with species nor quality of acceptable timber.

The cost to the Memphis firm of obtaining hardwood logs in the Region would vary from the above illustration by shifting the milling cost of $15.00 per thousand to the purchaser and doubling the transportation cost. For example, the cost of obtaining logs would include the following items: logging, $7.00 to $10.00; transporting, $.40 per mile; and woods-run stumpage, $15.00 per thousand. At a point 50 miles from Memphis, the cost of obtaining logs, f. o. b. mill, would be about $45.00 per thousand. Assuming milling cost to remain at $15.00, total cost to the buyer would be about $60.00 per thousand. This cost would vary directly with changes in hauling distance at the rate of $1.00 for each two and one-half miles. Another 50 miles would add $20.00 per thousand to the cost of logs as against $10.00 to the cost of obtaining lumber. The effect of transportation

costs on the total cost of moving logs to market is brought out very clearly in this illustration. The log-supply area is more restricted than the rough-lumber supply area. As a practical matter, operating costs tend to be contractual and fixed; while the purchase prices, including stumpage and lumber and log, f. o. b. mill, tend to vary and to determine the size of the purchasing area. As long as the buyer can purchase on cost of production basis, there is always an incentive to purchase lumber rather than logs.

From the standpoint of the hardwood buyer, the decision to buy logs or lumber depends upon several factors. Of primary importance is the price differential. If the differential in price is in excess of the difference in transportation cost, it would be more economical for him to purchase logs instead of lumber. The greater the hauling distance and cost, the greater is the preference for lumber over logs.

Some buyers do not possess the facilities, personnel, nor disposition to combine operations back toward the source of supply and engage in stumpage buying, logging, transporting, and operating portable sawmills in the woods. Instead, they prefer to purchase lumber at whatever price necessary to get the required supply. The maximum price under these circumstances tends to approximate the marginal value of the lumber to the buyer. Roughly, this maximum price is equal to the market value of the lumber fully processed less the processing costs and selling overhead.

When all costs are taken into consideration, there is great variation in the values of different qualities of logs graded on lumber-grade yield basis. All costs remain about the same for all quality logs; yet, poor-quality logs yield low-value products. High-grade logs yield surplus values because of superior lumber yields in quality and price. Therefore, the owners of high-grade logs only are in a position to bypass local milling operations and sell in the high-price markets demanding quality.

Prime Log Marketing Costs

The discriminating sellers of hardwood logs may experience higher costs of logging and transporting than the woods-run cost figures above indicate. Because of scattered location of prime-quality trees and the selective nature and limited scale of operations, contract costs of logging, picking up, and transporting to the market are likely to be higher than for similar work more closely concentrated and in greater volume. The actual costs tend to vary with local circumstances, ranging from about $10. 00 to $20. 00 per thousand for logging and from about $. 20 to $. 50 per mile per thousand for transporting. The hauling of commercial veneer logs in 9-foot lengths requires a short truck bed which limits the amount hauled per trip and increases the cost.

Within a radius of 100 miles from Memphis or any other suitable market, the maximum out-of-pocket or variable cost of logging and transportation approximates $70.00 per thousand feet. To evaluate costs properly, the seller should add an unknown but small amount to cover the cost of maintaining contact with the buyer. This involves frequent telephone calls and/or occasional trips to the market center. Actually, the seller is taking over the conventional functions of the timber buyer and his management responsibilities and costs tend to increase. The logger and truck operator expect to be paid upon the completion of their tasks. This will involve financing by the seller out of his personal resources or through a local bank.

Also, an additional amount should be added known as opportunity costs. This is an amount equal to the net return from the next best use of the timber. Presumably, the best alternative use of prime hardwood timber is to sell it to a local sawmill within the Region for lumber manufacture. The top price generally prevailing in the Region for Grade 1 logs to be used in lumber manufacture is around $65.00 per thousand delivered to the buyer's mill or rail terminal. Assuming the minimum distance for which transportation is required to be about 50 miles and other cost factors unchanged, this would amount to a net return to the seller of around $45.00 per thousand. Under general market conditions prevailing in the Region, therefore, the highest opportunity cost of withholding prime hardwood logs from lumber markets and directing them into veneer manufacture is about $45.00 per thousand on the average. This amount should be added to other costs involved in marketing prime-quality hardwood logs.

In summary, total costs of harvesting and marketing prime logs within 100 miles from the market include the following estimates:

Logging	$10.00 to $20.00 per thousand
Transporting	$20.00 to $50.00 per thousand
Opportunity cost	$45.00 per thousand
Management and financing	$ 5.00 per thousand
Total maximum	$120.00 per thousand

It seems reasonable to assume that prime hardwood logs will move into the prime markets only when the price is sufficiently high to cover the cost items in the above tabulation. The greater the distance from Memphis and the shorter the distance to alternative commercial veneer markets, the higher are the opportunity, management, and transportation costs. As a rough approximation, it seems that the geographical scope of a prime-quality hardwood log market is limited in miles of distance from the buyer to about three-fourths the purchase price

in dollars per thousand. For example, a buyer could draw logs away from other uses for a distance of 120 miles with a minimum purchase price of $160.00 per thousand feet delivered to the mill.

Marketing Costs of Special Species Logs

There are two groups of hardwood species found in the Region which are commonly classified as special species because of their possible uses. The first group includes ash, dogwood, and persimmon. Because of toughness of texture, they are used to make such things as spools, shafts, and small dimension stock. The second group includes cherry, cedar, and walnut, and sometimes cottonwood, poplar, maple, and hackberry.

If these species are harvested and marketed along with other hardwood species on a woods-run basis, there is no variation in costs. Neither is there a variation in price to the producer. However, operations specializing in these limited species do require additional costs and should yield additional net revenues from the higher prices they tend to command in the specialty markets. No specific cost estimates for this type of operation were found during the course of this study; however, some opinions were expressed to the effect that "the handling cost of specialty species is very high." Others expressed the opinion that "the more specialized the species, the greater the man-hours and the lower the yield in thousand feet of output." In the light of these statements, it appears that the cost of logging and transporting these species may very well double that for prime logs, excluding opportunity costs for the small diameter species like dogwood and persimmon which do not qualify for sawtimber. These observations seem to suggest a cost range estimate of from $75.00 to $120.00 per thousand feet for harvesting and marketing specialty hardwoods within a radius of about 100 miles from the market.

Rail Transportation Costs

Rail transportation may be used to transport logs to market from terminals located away from the market in excess of the maximum distance for transporting them economically by truck. The choice between truck and truck-rail transportation depends upon comparative costs, highway conditions, and actual availability of highways, railroads, and log-handling equipment. Producers may use a combination of truck-rail transportation to reach the Memphis market from almost any point in the Region. However, the rising cost of transportation tends to impose a limitation on the size of the supply area of that market. A few selected samples of carload rates on logs from common shipping points within the area to competing hardwood market centers may indicate the extent of supply areas of competing markets by showing rail cost differentials. A few such rates are shown in the following tabulation:

Shipping Points	Rates by Destinations			
	Memphis, Tenn.	Greenville, Miss.	Meridian, Miss.	Jackson, Miss.
Ackerman	23(1)	23(1)	5427(2)	6633(2)
Grenada	5427(2)	-	-	6633(2)
West Point	17(1)	17(1)	5427(2)	7838(2)
Winona	6633(2)	-	-	5427(2)

(1) Rate in cents per hundred pounds, minimum weight 40,000 pounds.
(2) Rate in cents per car, minimum weight 80,000 pounds, excess in proportion except as noted.

Source: Jones, W. R., Assistant Freight Traffic Manager, Illinois Central Railroad, Memphis, Tenn., letter dated September 4, 1959.

The above tabulation contains log rail freight rates which have been established for the shipping points and destinations shown. Rates on the basis of cents per carload of 80,000 pounds -- approximately 4,000 board feet -- may be estimated for other shipping points in the Region by reference to the following tabulation of distances and rates:

Distances in Miles (1)	Rates per Carload, 80,000 pounds
25 miles and less	2894
50 miles and over 25	3618
75 miles and over 50	4222
100 miles and over 75	5427
125 miles and over 100	6633

(1) The table of distances to be used in connection with distance rates is contained in IC Tariff 3714-A, I. C. C.

Source: Illinois Central Tariff 66-G, Item 2399, p. 121, and letter from W. W. Greff, District Traffic Agent, ICRR, Jackson, Mississippi.

On the basis of rail freight rate differentials alone, Ackerman and West Point are located within the natural supply area of Meridian; Winona, the Jackson area; and the other shipping points in the above tabulation are in the natural supply area of Memphis. The Memphis market must offer prices sufficiently high to overcome rail freight rate disadvantages if it is to penetrate the natural supply areas of Jackson and Meridian and obtain logs from points below Winona and as far away as Aberdeen and West Point. Prices favorable to the sellers do overcome transportation cost barriers.

Relative Prices

The utilization of hardwood timber is no exception to the general economic principle that goods tend to flow into those markets which offer the highest net monetary returns. This is only a very long-run characteristic

of the hardwood market because of imperfections in the market. Lack of information as to relative prices some-

times prevents sellers from taking best advantage of market situations. Also, lack of proper facilities, widely

scattered timber stands, and need for money under distress selling conditions tend to prevent the flow of hard-

wood logs into the most economical markets. Imperfections in the hardwood market are made greater by a

multiplicity of prices and scarcity of standards. Most prices are determined by negotiation of individual sales.

Nevertheless, there seem to be at least levels of price ranges currently affecting hardwood transactions in this

Region. These price levels are timber stumpage prices, f.o.b. mill log prices, and forest products prices.

The current range of hardwood stumpage prices is from $8.00 to $35.00 per thousand board feet. Buy-

ers appear to be using an average woods-run price of about $17.00 per thousand in estimating the value of tim-

ber tracts purchased for a lump sum. If the timber is of good quality containing a high percentage of number

1 trees and the seller is in a favorable bargaining position, the price may go as high as $30.00. Under rare

circumstances, $35.00 may be offered. No one seems to desire timber of very poor quality worth less than

$8.00 stumpage.

Hardwood logs delivered to a medium or large size mill within the area tend to bring a price of about

$45.00 per thousand for number 2 logs 13 inches and above in diameter at the small end. The price of number

1 logs in the same markets is around $65.00 per thousand. The prices of the same log grades in the Memphis

market are about $20.00 higher.

High-quality prime logs suitable for making commercial veneer do command a premium price in the

Memphis market. Prime logs are superior in quality to Grade 1. They must be completely clear of all defects

and be cut in 9-foot lengths. Prime logs 22 inches and larger in diameter at the small end may command a

price as high as $270.00 per thousand f.o.b. Memphis mill. Prime logs 18 to 22 inches in diameter at the

small end sell for a price ranging from $150.00 to $170.00 per thousand. One official described these logs as

"clear, all-round, three-face logs." The price varies by quality and species. The species in greatest demand

are ash, poplar, white oak, red oak, and cottonwood. However, all soft hardwoods are suitable for veneer

manufacture.

Lumber is the most important form in which hardwood of the Region is marketed. Most of the hard-

wood marketed outside is in lumber form. Small mills located in the forest or nearby saw the timber into lum-

ber and sell it green or air-dried. A limited number of medium size mills in the Region are grouped with dry

kilns and planer mills. These organizations manufacture and grade finished lumber and dimension stock and wholesale to industrial users.

The prices of rough-dried lumber vary with quality and species; however, at this early stage in production, the variation is slight. Prices delivered, f. o. b. mill, range from about $80.00 to $90.00 per thousand for good grade. Good grade oak is priced at about $90.00 and good grade gum at about $85.00.

The wholesale prices of finished lumber are published and seem to be more definite and detailed than for any other form of wood. These prices vary by species, grade, and thickness. Selected wholesale lumber prices as reported by the Hardwood Market Report for the second week in February, 1960, are listed on page 42.

Other Product Markets

In addition to logs and both rough and finished lumber, hardwood may be marketed in the form of pulpwood, stave bolts, ties, and specialty products. In 1956, about 10 per cent of the annual cut of hardwood went into pulpwood. Production of pulpwood seems to be concentrated in the southern and central parts of the Region. Soft hardwoods are being used for this purpose, especially willow, gum, black gum, poplar, and cottonwood. Prices tend to vary by species from about $10.00 to $13.00 per unit (4' x 8' x 63"), f. o. b. rail head, and from $1.00 to $3.00 stumpage.

Stave bolts tend to sell for about 90 cents per cord foot for good grade white oak cut in 39 inch bolts and delivered to the local mill. High-quality hardwood is required for this purpose.

Hardwood ties are used by the railroads, of course, and are purchased by them. Current prices for number 5(7" x 9") oak ties are about $1.80 each, f. o. b. rail terminal, and $1.50 for number 3(6" x 8") ties. Gum tie prices are about 5 cents less per tie for similar sizes.

Certain specialty products are manufactured from particular species of hardwood. These species include ash, dogwood, and persimmon used in the manufacture of handles, stocks, spools, etc., and cherry, cedar, and walnut used in the manufacture of furniture and cabinets. One buyer quoted a price of $85.00 per thousand feet, Doyle scale, f. o. b. Memphis, for hickory, $90.00 for ash, and $185.00 for persimmon. His price quotations and log specifications for grade requirements are included in the Appendix. Other estimates range from $150.00 to $185.00 per thousand for ash, dogwood, and persimmon and from about $100.00 to $150.00 for cherry, cedar, and walnut. Specifications are similar to those in the Appendix.

Table XVI

ESTIMATE OF F.O.B. TEXAS AND LOUISIANA MILL POINT AVERAGE
MARKET PRICES ON SALES TO CONSUMING TRADE OF BAND SAWN
SOUTHERN HARDWOODS IN CARLOAD QUANTITIES, RANDOM WIDTHS
AND LENGTHS, ROUGH, AIR-DRIED, AND GRADED, FEB. 13, 1960

Species, Grades and Widths	Prices per M'
White Oak, Plain	
1 inch:	
Firsts and Seconds	192
#1 Common	107
#2 Common	76
Red Oak, Plain	
1 inch:	
Firsts and Seconds	178
#1 Common	110
#2 Common	76
Red Gum, Plain	
1 inch:	
Firsts and Seconds	205
# 1 Common	125
Sap Gum, Plain	
1 inch:	
Firsts and Seconds	119
#1 Common	99
#2 Common	50
Ash, Tough	
1 inch:	
Firsts and Seconds	190
#1 Common	142
Poplar, Medium Texture	
1 inch:	
Firsts and Seconds	170
#1 Common	125
#2 A	87
Tupelo Gum	
1 inch:	
Firsts and Seconds	128
#1 Common	108
#2 Common	52
Black Gum, Quartered	
1 inch:	
Firsts and Seconds	135
#1 Common	120
Cottonwood	
1 inch:	
Firsts and Seconds	132
#1 Common	102
#2 Common	67

Source: Hardwood Market Report, Vol. XXXVIII, Feb. 13, 1960, p. 2.

CHAPTER IV

MARKETS FOR PRIME LOGS AND SPECIALTY PRODUCTS

The hardwood forest products from this Region enter the market in a variety of forms and through several alternative channels. From the standpoint of volume, the most important form probably is unfinished green or air-dried lumber and the most important channel is selling by the small sawmills to medium-sized mills which, in turn, sell directly to the large mills in and outside the Region. Poles and cooperage bolts are purchased by local processing plants where they are processed and sold as cooperage stock and commercial poles to outside buyers. Pulpwood bolts and veneer logs are marketed almost entirely through channels leading to buyers located outside the Region. There are no pulp mills nor commercial veneer mills located within the area. However, there is a limited number of box and crate veneer plants inside the area. Special hardwood species are sold to local cabinet shops and to commercial specialty manufacturers outside the immediate area. Any evaluation of hardwood market outlets for this Region leads naturally to a consideration of the Memphis hardwood market. This market is the focal point through which most of the commercial hardwood products are marketed to commercial consumers.

1. THE MEMPHIS HARDWOOD MARKET

Even though the Memphis hardwood market as the regional center in which transactions take place is located outside the North Mississippi Survey Region, it is of economic significance to the Region because of (1) relatively close proximity and (2) scope of the market and its effect on hardwood values in the Region. Because of the importance of that market, this chapter is devoted to a description of some competitive characteristics and operating practices of the market which may bring to light some possible circumstances which sellers may wish to seek or avoid in marketing their hardwood logs or other forest products through that outlet.

Competitive Conditions

The extent to which a manufacturer is in competitive relationship with others in the industry depends upon the organization of production and the structure of the markets through which raw materials are purchased and finished products are sold. Few manufacturers of forest products are organized to perform a

single process and produce a single product. The majority of such firms combine operations vertically or

horizontally and produce multiple products. "Vertical integration is the coordinated control of two or more

steps in the productive process which follow one another."[1] Instances in which sawmills, planer mills, and

dry kilns are combined under single management controls are illustrations of vertical integration. More com-

plete combination is provided through backward and forward integration of operations by expanding back to

the source of supply, growing timber and harvesting the logs and expanding toward the consumer and distrib-

uting the output through retail outlets.

Vertical combination allows a firm to improve both its production and sales positions. Production

is improved through greater economies of size and assurance of raw material supply. Sales position is im-

proved through expansion and stabilization of the market, especially in the lower stages of processing.

Vertical combination of production, manufacturing, and marketing processes is observable among

the Memphis hardwood manufacturers. A similar situation probably prevails in every other hardwood cen-

ter in this country. Some firms own timber lands as well as manufacturing and marketing facilities. They

manage the production processes from the growing of timber to at least the wholesaling of the finished prod-

uct. Of course, all the facilities are not located in the Memphis hardwood center. There seems to be a

greater number of distribution firms in the area with production facilities elsewhere than of firms with both

manufacturing and distribution facilities in the area. However, only those firms interested in purchasing

hardwood logs are of significance to the purposes of this study.

It should be added that the most completely integrated firm can provide the most complete and

satisfactory market for hardwood logs and other forest products from this Region. Such a firm can utilize

most fully a wide variety of logs and other products such as lumber and specialty items.

"Horizontal integration is the coordinated control of two or more productive activities which are at

about the same stage in the productive process."[2] This type of combination, likewise, permits the firm to

accomplish economies of scale and efficiency in marketing which it could not do with a single operation.

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[1] Worrell, Albert C., Economics of American Forestry (New York: John Wiley and Sons, Inc., 1959), p. 164.

[2] Ibid., p. 165.

It seems to be common practice for one firm to exercise administrative control over several horizontal processes. Among the large firms, there may be found instances of unified management of diversified operations at the same or similar production levels. For example, a firm may be engaged simultaneously in the manufacture of plywood, flooring, dimension stock, and specialty products.

The Memphis firms tend to be conventional in the production organization. The special purpose firms seem to be limited in the number of processes and products while others are quite diversified in both.

From the point of view of the hardwood producer in this Region, vertical and horizontal combinations in the operations of prospective buyers offer both advantages and disadvantages. The advantages are related to the ability of the market to absorb a wide variety of forest products. At some price, a buyer may be found for almost any type of standard grade commercial log. In this respect, these characteristics tend to improve the market and increase the value of hardwood products in the Region.

The disadvantages are related to the ability of buyers to take over the functions of the sellers when it is to their advantage to do so through backward vertical combination. Under present cost conditions, it is possible for suppliers to produce rough mill-run lumber for manufacturers at about $50.00 per thousand, plus costs of handling and transportation, and logs at a cost which is slightly higher. This operation affords little profit for the producer and those working for him. The disposition of buyers to extend operations backward to the source of supply tends to establish a maximum price for lumber and logs not far above the cost of production. By the same token, the disposition of suppliers with facilities located outside of Memphis to extend operations forward to the market either by establishing distribution offices in Memphis or selling to the local consuming trade by trucks tends to limit the maximum price of lumber to the comsumer at a level not far above the cost of production. Obviously, the limited operator--buyer or seller--who does not combine operations is at a disadvantage. The hardwood log seller would do well to be on guard against this type of situation and avoid competing with backward combined operations.

The market structure through which hardwood products flow from the producer to the consumer varies considerably. Like most natural resources outside the field of minerals, raw materials are owned and marketed by a great many persons. At the same time, the number of buyers is considerably less and, as the transactions move toward the wholesaler, the number of buyers per seller in the market becomes smaller. From the wholesaler toward the consumer, the number of buyers in the market becomes relatively greater.

On the basis of buyers and sellers in the market alone, buyers have the competitive advantage in all transactions involving hardwood from stumpage market to the wholesale market and sellers are in the most advantageous competitive position from the wholesaler to the consumer.

Sometimes market structure may be determined on the basis of product characteristics. Hardwood markets offer some possibilities in this respect. In the raw material stage of production, hardwood products are substantially different. As the material flows through a series of consecutive processes, the resulting products are made more uniform through grading, stamping, classifying, and sorting. Product distinctiveness reduces price competition by removing the possibility of easy substitutions while similarity of products renders substitution easy and competition greater. Therefore, on the basis of product characteristics alone, the degree of competition increases as hardwood flows through the production processes toward the consumer.

In the sale of hardwood logs in the Memphis market, sellers in this Region are faced with an oligopsony situation: the buyers are few, sellers are many, and the products (logs) are not uniform. Particular prices are not determined by market forces altogether, but by negotiation between buyer and seller. Buyers prefer to deal with individual sellers on a negotiated price basis. Several factors tend to keep the market informal and invite price determination by negotiation rather than by competitive forces. First, the lack of uniformity of logs prevents the development of a so-called "log market." A market which is subject to frequent changes may exist at any given time for a particular truck load of logs of a particular quality and species. Second, the practice of buyers in shifting geographical points of concentration of buying effort renders the market unstable and keeps the sellers separated. The North Mississippi Region is only a small part of the total supply area for the Memphis market. Buyers may negotiate a purchase in one of many areas and devote their attention to that area for several months. In the next period, attention may be shifted to another area quite a distance away from the first. This does not appear to be a deliberate purchasing policy as much as a result of the very nature of log procurement. Nevertheless, it disrupts procurement relationships which would tend to become established in the absence of such a practice. The third factor which tends to isolate hardwood log transactions is the possibility of buyers taking over the functions of log producers whenever supply becomes scarce and log prices exceed normal cost of production.

Specialty Products Market

Unlike the markets for quality oak and soft hardwood logs, the markets for specialty products are both local and external to the Region. Local buyers are the operators of small cabinet shops and small dimension stock plants. As a rule, these buyers prefer to buy the logs sawn into timber 6" x 6" or 4" x 4" and 4 or 8 feet in length. Shop equipment can be used to saw the timber into lumber of desired dimensions. Average prices paid by these small shops for specialty hardwood appear to be as high as in other markets outside the area.

Most any hardwood buyer in the Memphis area is a potential buyer of specialty hardwood lumber. Usually it can be resold with profit. However, only a few firms are interested in purchasing hardwood logs of special type species. Large firms using band saws are not equipped to saw the small diameter species into timber or lumber. Firms actively seeking specialty hardwoods have very definite specification standards. A sample of such standards is contained in the Appendix. The most active markets for special type hardwood discovered during this study are for ash, persimmon, hickory, and dogwood.

Summary and Conclusions

Significant characteristics of the hardwood market in Memphis have been described as they relate to sellers in the Region seeking to approach that market as an economical outlet for their logs. There seems to be a wide variation in the production organizations of the buyers. Some are mere distribution firms acting as brokers or agents in the sale of lumber and other products. Others have combined operations to include timber growing, logging, and sawmilling, as well as a multiplicity of horizontal manufacturing operations. The combined operations tend to prevent log prices from rising during periods of slack inventory and temporary shortages of supply.

The number of sellers seeking to sell in the market probably exceeds the number of active buyers at any one time. Buyers seem to prefer to negotiate sales, rather than to participate in the market at published prices. Log grading standards are not uniform and the market fluctuates.

A desirable approach for the seller seems to be that of making very definite and clear arrangements for all sales prior to delivery to the prospective buyers. Most of the buyers are very clear in their positions that such arrangements may be made by mail, telephone, or visits to the firms. Those who do

not make such prior arrangements may experience disappointment and financial reverses because of market dynamics and uncertainties.

The juxtaposition of a mill, or its location in relation to other similar firms, and its emphasis of product types tend to have some bearing on its intensity of demand for hardwood logs. Firms which are clustered in location and complementary in production operations will usually accept all types of hardwood logs which meet minimum quality requirements. Intercompany exchange of logs and lumber allows each firm to select from its own procurement materials meeting specification requirements of that firm and exchange others with firms with different requirements. For example, firms specializing in products requiring medium quality and ordinary species of logs should not use good-quality and prime logs obtained in procurement for this purpose. Instead, it may exchange them for medium-quality logs and lumber with advantage. These relationships tend to broaden the scope of the group of firms for hardwood logs.

Likewise, firms specializing in hardwood flooring, dimension stock, or other products made from lumber prefer to buy lumber rather than logs so long as there is no great differential in price.

Apparently, hardwood logs are purchased by a limited number of principal firms in Memphis. Prime-quality logs are purchased and utilized by an even smaller number of firms. Firms which actively seek high-quality and prime-quality oaks and soft hardwoods are those which manufacture commercial veneer as a single operation or in combination with operations at the same level of manufacture. Commercial veneer is used to make plywood, furniture, and cabinet facing and the like. It brings a better price and requires better quality than container veneer. There are some, but few, firms in the Memphis area specializing in this type of operation. They are located in the southern and eastern outskirts of the city.

CHAPTER V

CONCLUSION

The North Mississippi Forest Survey Region includes twenty-six counties in the north and northeastern parts of the State. Hardwood timber is an important raw material of the Region. Proper management of hardwood forests and effective marketing of hardwood products are essential to long-run economic growth. This study is concerned with the broad aspects of marketing with special emphasis on prime-quality hardwood logs and specialty products. Attention has been given to (1) availability of total hardwood supply in terms of quantity and quality, (2) economics of harvesting and transporting hardwood products as reflected in cost and price estimates, and (3) desirable approaches to the Memphis market to be found in competitive relationships and practices of hardwood buyers. Emphasis has been placed on high-grade and specialty species of hardwood without attempting to segregate them from the over-all production and marketing processes.

Even though the long-run supply prospects of hardwood in the Region appear to be favorable as indicated by an excess of annual growth over annual cut, the stands are scattered and varied in quality. A great portion of the inventory is in cull timber. Oak and gum are the most predominant species. High-grade trees seem to be in stands located in river bottoms and other lowland areas. Specialty species are scattered widely throughout the area.

Harvesting and marketing of quality logs and other products must be selective as a deliberate policy of buyer and seller. One should expect harvesting costs of such quality timber to be higher and marketing risks to be greater than those commonly experienced in non-selective operations.

The Memphis hardwood market is economically accessible by truck or rail to producers in, roughly, the western half of the Region. It is an attractive market for prime-quality and specialty hardwood from any point within the Region when the price is sufficiently high to cover all costs, including opportunity cost, stumpage, logging, transporting, financing, and adequate return for additional managerial effort required. At the present time, the price is sufficient to assure profitable marketing of this type hardwood from a distance in excess of 100 miles from Memphis.

Certain features in the purchasing procedures of log buyers require caution in approaching that market. There does not seem to be a standard market for prime and good-quality logs for which prices may be determined for an extended period of time. Prices are determined ad hoc after thorough inspection and transactions are made through negotiation. Markets for specialty species such as ash, dogwood, persimmon, cedar, cherry, and walnut tend to be more standard and objective. Buyers will quote prices and state specification requirements. Sellers are urged to make thorough inquiry about prices and specifications or maintain regular contact with buyers on these matters prior to delivery of hardwood logs to the buyer's mill.

Appendix I

CUTTING REQUIREMENTS FOR STANDARD GRADES OF HARDWOODS

Exceptions and other requirements are stated under captions of the desired grade and species in the rules book of the National Hardwood Lumber Association of Chicago.

Grade	Width	Length	Minimum Cutting	Surface Cutting	Clear Face, %	Cuts	Remarks
Firsts	6" and up	8'-16'	4" x 5' or 3" x 7'	4'- 9'	91 2/3	1	
				10'-14'	91 2/3	2	
				15' and up	91 2/3	3	
Seconds	6" and up	8'-16'	4" x 5' or 3" x 7'	4'- 5'	83 1/3	1	6' to 15' surface measure will admit one additional cut to yield 91 2/3% clear face.
				6'- 7'	83 1/3	1	
				8'-11'	83 1/3	2	
				12'-15'	83 1/3	3	
				16' and up	83 1/3	4	
Selects	4" and up	6'-16'	4" x 5' or 3" x 7'	2'- 3'	91 2/3	1	Reverse side cutting sound. 4' and over shall grade on one face as required in seconds with reverse side of board not below No. 1 common.
No. 1 common	3" and up	4'-16'	4" x 2' or 3" x 3'	1'	clear		3' to 7' surface measure will admit one additional cut to yield 75% clear face.
				2'	75	1	
				3'- 4'	66 2/3	1	
				5'- 7'	66 2/3	2	
				8'-10'	66 2/3	3	
				11'-13'	66 2/3	4	
				14' and up	66 2/3	5	
No. 2 common	3" and up	4'-16'	3" x 2'	1'	66 2/3	1	2' to 7' surface measure will admit one additional cut to yield 66 2/3% clear face.
				2'- 3'	50	1	
				4'- 5'	50	2	
				6'- 7'	50	3	
				8'- 9'	50	4	
				10'-11'	50	5	
				12'-13'	50	6	
				14' and up	50	7	

Example of how a hardwood board is graded: A hardwood board 12" wide and 16' long contains the following clear-face cuttings, measured in units according to width in inches and length in feet as follows:

5 1/4" x 8'	42 units
6 1/4" x 3 1/2'	21 3/4 units
3 1/4" x 3'	9 3/4 units
7" x 3'	21 units
12" x 3'	36 units
Total	130 1/2 units

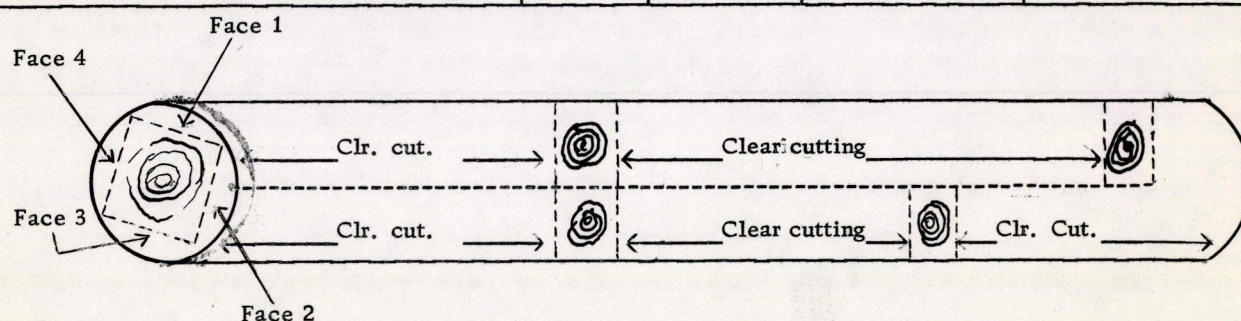The surface footage of the board as obtained from the lumber grading rule is 16.

To obtain a grade of FAS for this board, the total of the clear-face cuttings would have to be 83 1/3% of the surface measure, or 10/12. To determine the correct number of units needed, multiply the surface measure 16 by 10 to equal 160 units. This board does not contain enough units to make an FAS board. The number of units required for 66 2/3% clear-face cuttings is 8 times the surface measure 16 or 128 units. This is sufficient to make the board only a No. 1 common grade. Therefore this board is graded, according to its size and available units of clear cuttings, as a No. 1 common grade.

Source: Brown, Nelson C., Lumber (New York: John Wiley and Sons, Inc., 1947), pp. 194-195.

Appendix II

HARDWOOD LOG GRADES FOR STANDARD LUMBER

Grade Factors	Log Grade 1		Log Grade 2	Log Grade 3
	Butts only	Butts and uppers	Butts and uppers	Butts and uppers
Diameter (minimum)	13"–15"	$\binom{16"-19"}{20"+}$	11"	8"+
Length (minimum)	10'+	10'+	$\binom{8'-11'}{12'+}$	8'+
Clear Cuttings (on the 3 best faces)				
Length (minimum)	7'	5' : 3'	3'	2'
Number on face (maximum)	2	2	2 : 3	Unlimited
Yield in face length (minimum) . . .	5/6	5/6	4/6	3/6
Sweep and Crook Deduction (maximum) . . .	15%	15%	30%	50%
Cull Deduction, including sweep (maximum)· ·	40%	40%	50%	50%
Sound End Defects, area (maximum)		--See instructions--		

Face 1
Face 4
Face 3
Face 2
Clr. cut.   Clear cutting   Clr. cut.
Clr. cut.   Clear cutting   Clr. Cut.

Exceptions. In ash and basswood 12" d. i. b. for grade 1 butts.
     Grade 2 10" d. i. b. must be grade 1 surface quality.
     Grade 2 11" d. i. b. limited to two cuttings.
     Grade 2 8' and 9' lengths limited to 12" d. i. b. ; 3/4 yield in not more than two 3'+ cuttings.
     Sweep and crook allowance reduced 1/3 in logs with more than 1/4 diameter in sound end defects.
     Sixty per cent cull deduction permitted in grade 2 if otherwise of grade 1 quality.
     Sixty per cent cull deduction permitted in grade 3 if otherwise of grade 2 quality.

Source: Hardwood Log Grades for Standard Lumber:
     Proposals and Results (Madison, Wisconsin;
     United States Department of Agriculture, Forest Service, Forest
     Products Laboratory, 1953), p. 3a.

Appendix III

LOG PRICES AND SPECIFICATIONS

CHARLES O. COX CORPORATION

Date_____8-4-59_____

HICKORY LOG SPECIFICATIONS

Lengths: 6' 7' 12' 14' 15' 18'   Cut 4" over in length to allow for checking

Grade	Diameter	Price per 1000 Feet
#1	10" & up	$85.00
#2	10" & up	55.00

#1-Logs must be clear three sides.
   Logs must have at least 4" of clear white sap wood.
   Not over one-third of diameter in heart wood.

All wormy, shaky, in-growing bark, dotty, bad pecky and curly and knotty logs will be culled.

ASH LOG SPECIFICATIONS

#1-Straight, clear, free of knots, good tough texture.

#2-Permits few knots, some dark wood, medium texture.

Punky logs, excessive dark hearts, excessive knotty logs will be culled.

Swell butted logs will be cut back to eliminate the butt swell.

Lengths: 6' 9' 12' 16' 18'   Cut 4" over in length to allow for checking

Grade	Diameter	Price per 1000 Feet
#1	9" & up	$90.00
#2	9" & up	60.00
Logs under 8' in length #1	9" & up	70.00
#2	9" & up	45.00

PERSIMMON LOG SPECIFICATIONS
Subject to our inspection

All logs irrespective of grade must be fresh cut from live trees.

No. 1 Grade

To be 10 inches and up in diameter the narrow way at the small end. To be sound and practically clear of all defects, black heart or hollow not to exceed one-quarter the diameter of the log permitted.

No. 2 Grade

To be 9 inches and up in diameter the narrow way at the small end. Defects such as occasional knots, black heart, etc. permitted, providing at least two-thirds clear sound cutting and in the cases of black heart or hollow at least 4 inches of clear white wood all around between black heart or hollow and bark. Wormy, blued or sour logs are culls.

LONG LOGS

12 - 14 - 16 Feet long with not over 25% of total feetage of load 8 feet and 10 feet. All long logs to be cut 4 to 6 inches over to tallow w for equalizing.

SHORT LOGS

44 inches long scaled as 42 inches

PRICE DELIVERED OUR MILL MEMPHIS BY RAIL OR IN TRUCKS
Per 1000 Feet

	Long Logs
No. 1 Logs	$185.00
No. 2 Logs	125.00

Short Logs 44 inches - $5.00 less than prices quoted above.

SCALE

Doyle-Scribner. Doyle scale for logs up to 27 inches. Scribner for logs 28 inches and over. All logs measured across the heart, the narrow way inside the bark at the small end.

LOADING

Be sure you have a full carload. About 3000 feet make a carload, or 4000 feet on per car rate. Load short logs in box or stock cars. Do not load short logs in gondolas or on flats. Be sure to consign "short logs" as "short logs".

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